



Understanding successful physical activity behaviour change using a grounded theory methodology

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REFERENCE

**UNDERSTANDING SUCCESSFUL PHYSICAL ACTIVITY BEHAVIOUR
CHANGE USING A GROUNDED THEORY METHODOLOGY**

Andrew John Hutchison

A thesis submitted in partial fulfilment of the requirements of Sheffield Hallam
University for the degree of Doctor of Philosophy

September 2009

Abstract

Research evidence highlights regular physical activity (PA) as an increasingly important factor in the prevention of a variety of chronic diseases. Consequently, encouraging people to make PA related lifestyle changes is an everyday challenge faced by health professionals in primary and secondary health care settings. Although a number of intervention strategies have been developed and implemented, research evidence presents only limited support for their efficacy. While short-term changes may be achievable using current intervention strategies, long-term change (i.e. maintenance) appears much more difficult to achieve.

Although many public health interventions are developed without explicit reference to theory, evidence suggests that the explicit use of theory will significantly improve the chances of effectiveness (Nutbeam & Harris, 2004). As no existing theoretical models are specifically intended to account for PA behaviour change, a number of pre-existing theoretical frameworks have been adopted to explain PA participation. This thesis reviews the existing body of theoretical literature in exercise psychology alongside conducting a systematic review (Study 1) of interventions based on the Transtheoretical Model (TTM). As a result, the theoretical depth or explanatory quality of existing models and theories is called into question, when applied to a PA context and specific phenomena such as long-term PA behaviour change.

After reflecting on the debate surrounding different epistemological viewpoints and theoretical perspectives, applications of an alternative theory generating research approach (the Grounded Theory Methodology: GTM) are explored and evaluated. As a result, in light of the considerable epistemological debate that surrounds GTM, study 2 of this thesis focuses explicitly on methodological issues within exercise psychology. A critical review of applications of GTM within exercise psychology is conducted. Results reveal that many existing studies demonstrate a poor understanding of GTM and/or fail to present an adequate account of the research process.

Ultimately the results of study 2 provide valuable implications for study 3 of this thesis, which adopts GTM to develop an ecologically valid explanatory model of long-term PA behaviour change. Twenty-one adult participants (9 male, 12 female), aged between 38 and 62 years, were recruited from a countywide PA referral scheme. All participants had made long-term, positive changes to their PA habits. Participants contributed to 25 in-depth interviews. All sampling and analytical procedures were dictated by the key tenets of GTM and a constructivist theoretical stance. To assist with the GTM process, the software package QSR-NVivo was used throughout. A grounded theory of long-term PA behaviour change is presented in the form of a multidimensional explanatory model. The model identifies a number of observed cognitive processes, which appear central to PA behaviour change and maintenance. The underlying mechanisms responsible for these are also highlighted. Results are discussed with specific emphasis on literature surrounding value theories, core beliefs and the introduction of prominent clinical psychology and psychotherapy approaches within exercise psychology. Finally, implications for theory development and applied practice are highlighted and directions for future research suggested.

Candidate's Statement

I declare that the work in this thesis was carried out in accordance with the regulations of the Sheffield Hallam University and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

Andrew J. Hutchison

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Abbreviations

BABCP	British Association for Behavioural and Cognitive Psychotherapies
BPS	British Psychological Society
COREC	Central Office for Research Ethics Committee
CPD	Continuing Personal and Professional Development
CRM	Central Referral Mechanism
CSIP	Care Services Improvement Partnership
DVM	Disconnected Value Model
DH	Department of Health
CAQDAS	Computer Assisted Qualitative Data Analysis Software
CBT	Cognitive Behavioural Therapy
GTM	The Grounded Theory Methodology
IAPT	The Improving Access to Psychological Therapies Programme
ISR	Independent Scientific Review
MI	Motivational Interviewing
NHS	National Health Service
NICE	National Institute of Health and Clinical Excellence
PA	Physical Activity
PARS	Physical Activity Referral Scheme
PHIAC	Public Health Interventions Advisory Committee
PMS	ProActive Management Service
SDT	Self-Determination Theory
SPAG	Somerset Physical Activity Group
TPB	Theory of Planned Behaviour

TRA	Theory of Reasoned Action
TTM	Transtheoretical Model
UK	United Kingdom
USDHHS	United States Department of Health and Human Services
VCT	Value Centred Theory

Glossary of Grounded Theory and NVivo Terms

Attributes	Demographic information that can be attached to documents or nodes in NVivo.
Boolean Logic	A method of searching data to create intersections (AND), unions (OR), differences (LESS), or negation (NOT).
Axial Coding	A type of coding whereby categories are treated as an axis around which relationships and dimensions are explored.
Case	Unit of analysis (e.g. interview participants).
Casebook	A table containing attribute information stored for each case in NVivo.
Case Node	A node representing a specific instance of a particular type (in this thesis a case node was created for each interviewee).
Categories	Higher order concepts representing phenomena.
Child Node	A node that is a subcategory of its parent node.
Coding	A process of defining what data are about.
Coding Query	An NVivo tool that allows the analyst to search for intersecting coding (i.e. search for text coded to more than one node).
Coding Stripes	An NVivo tool that allows the analyst to view segments of text or whole documents and see what additional coding occurred at that particular selection of text.
Coding Paradigm	An organisational scheme (proposed by Strauss & Corbin, 1990; 1998) designed to help capture the dynamic nature of events, encouraging analysts to gather and order data in such a way that structure (conditions) and process (actions/interactions) are integrated.
Constant Comparative Method	A method of analysis that involves making systematic comparisons between data, cases, concepts and categories to generate successively more abstract conceptual and theoretical understandings.
Core Category	A central theme that has emerged from the data analysis.
Dimensions	The range in which a property of a category can vary.
Focussed Coding	A type of coding which involves using the most significant or frequent earlier codes to sift through large amounts of data.

Free Nodes	A node that is not part of any hierarchical structure or tree.
Flip-Flop Technique	A comparative procedure which involves turning a concept 'inside out' or 'upside down' to obtain a different perspective on the event, object, or action/interaction
Initial/Open Coding	The initial coding phase, whereby the analyst begins to define what is happening in the data. Initial codes are provisional (because new possibilities can always emerge from the data), comparative and remain close to the data.
In Vivo Coding	The naming of a category by using the exact words of a participant.
Matrix Coding Query	An NVivo tool that allows the analyst to search for data coded to multiple pairs of items simultaneously.
Memo	A self-contained text file within an NVivo project
Memo (Linked)	A memo attached to a particular NVivo project item
Modeller	An NVivo tool for drawing conceptual models. These can include live links to documents and nodes.
Node	The “container” in which references to coded text are stored in NVivo.
Parent Node	The higher order category of a child node.
Properties	Characteristics of a category.
Relationship Nodes	Nodes created to record evidence of a connection of a particular kind between two project items. The relationship can be a simple association, or it can have one or two-way (symmetrical) directionality.
Sets	An organisational tool in NVivo for clustering documents or nodes together. Are often used to identify broader concepts based on potentially meaningful relationships.
Substantive Theory	Theory developed from a specific area of focus that is not necessarily generalisable to the larger population.
Theoretical Coding	A sophisticated level of coding, proposed by Glaser (1978), which specifies possible relationships between categories developed during focussed coding.
Theoretical Sampling	Collecting data that is specifically selected for characteristics that will allow for advancement of the emerging theory.
Tree Nodes	Nodes that are ordered in a logical hierarchical structure.

Chapter 1: Thesis Introduction

1.1 Introduction

1.1.1 Physical Activity and Public Health

Research reports and government policy documents present compelling scientific evidence to support the health benefits of regular physical activity (PA) (Department of Health: DH, 2009). As a consequence, PA is becoming an increasingly important factor in the treatment and prevention of a wide variety of chronic physical and mental health conditions including: coronary heart disease, type 2 diabetes, obesity, hypertension, depression and anxiety (DH, 2008; Roberts & Barnard, 2005; Saxena, Van Ommeron, Tang & Armstrong, 2005). In light of this research evidence available, the chief medical officer (DH, 2009) continues to advise that adults should aim to achieve a least 30 minutes of moderate intensity PA on five or more days of the week (60 minutes for children or young people). Coupled with this, the potential economic benefits of increased PA were highlighted, when in 2004, the annual cost of physical inactivity in England was estimated at £8.2 billion (DH, 2004). However, despite these well publicised benefits, evidence reveals an increase in the prevalence of the conditions listed above and in the numbers of people who live their lives in sedentary ways (DH, 2009; McPherson, Marsh & Brown, 2007; Sport England, 2008). In response to this, recent government policy documents reveal a number of current initiatives and aims, which centre on encouraging greater levels of PA participation within the population. To illustrate the contemporary nature of these issues, Table 1.1 presents a number of statements taken from policy documents, published within the last two years.

Table 1.1 Selection of Quotes from Recent Policy Documents

Recent PA Related Policy Goals	Source
“We aim to help at least 2-million more people in England be more physically active by 2012”	Before During and After: Making the Most of the London 2012 Games - Department of Culture Media and Sport (2008)
“Our ambition is to be the first major nation to reverse the rising tide of obesity and overweight in the population by ensuring that everyone is able to achieve and maintain a healthy weight”	Healthy Weight, Healthy Lives: A Cross Governmental Strategy for England - DH (2008)
“Sport England is committed to delivering 1 million people doing more sport by 2012-13”	Sport England Strategy 2008-2011 - Sport England (2008)

1.1.2 Encouraging and Supporting Behavioural Change

Despite an increased societal emphasis on the benefits of PA and the subsequent need to encourage greater PA participation, this thesis demonstrates that encouraging people to make sustainable PA related behavioural changes remains a complex issue. Although a wide range of interventions strategies have been developed and implemented to encourage PA behaviour change, research evidence presents only limited support for the efficacy of these. While short-term changes may be achievable using a number of current intervention strategies, long-term changes (i.e. maintenance) appear much more difficult to achieve (Hillsdon, Foster, Cavill, Combie & Naidoo, 2005; Kahn et al., 2002). As a result, encouraging and supporting individuals through PA related lifestyle changes remains an everyday challenge for many health professionals in a range of primary and secondary healthcare settings.

1.1.3 How do people Change?

Although many public health interventions are developed without explicit reference to theory, evidence suggests that the explicit use of theory will significantly improve the chances of effectiveness (Nutbeam & Harris, 2004). Specifically, if we are able to understand how people change, then interventions can be tailored accordingly. Consequently, to justify the nature of different intervention strategies, references are often made to an underpinning theory or theoretical model (e.g. Pinto, Frierson, Rabin, Trunzo & Marcus, 2005). However, this thesis demonstrates that no existing theoretical models are specifically intended to account for PA behaviour change (Marcus & Forsyth, 2003). Instead, a range of theoretical accounts have been adopted within exercise psychology, which has resulted in the identification of a wide array of

psychological, social, environmental and biological influences that appear to impact on PA involvement (Biddle & Mutrie, 2008). By critically examining the development and application of the different theoretical accounts adopted within exercise psychology, this thesis reveals a number of limitations with current theoretical understandings of long-term PA behaviour change.

1.2 Purpose of Thesis

In light of the increased attention PA is receiving as a means of encouraging improvements in public health, and in response to a number of limitations/gaps in our current understandings of PA behaviour change, the primary aim of this thesis is to advance current theoretical explanations of long-term PA behaviour change. By developing a better understanding of how people successfully change their PA habits and go on to maintain those changes, this thesis will present powerful applied implications for the development of future PA interventions. To achieve this aim, the Grounded Theory Methodology (GTM: Corbin & Strauss, 2008; Charmaz, 2006; Glaser & Strauss, 1967) is adopted. Justification for the decision to adopt a GTM based approach is presented in Chapter 4, alongside an overview of the considerable debate that surrounds applications of GTM. In light of these debates, the second aim of this thesis is to further legitimise GTM as form of enquiry within exercise psychology, by addressing a number of quality control issues associated with applications of GTM. Therefore, this thesis addresses both theoretical and methodological issues within exercise psychology, leading to valuable implications for not only future applied practices but also future research practices.

1.3 The Grounded Theory Methodology

As explained above, GTM is central to this thesis because it represents both the methodology selected to advance current theoretical understandings of PA behaviour change and the subject matter of the additional methodological issues explored. It has been described as “a systematic, yet flexible methodology for collecting and analysing qualitative data to construct theories that are grounded in the data themselves” (Charmaz, 2006, p. 2). A complete description of GTM is presented in Chapter 4 (Section 4), alongside a detailed justification for the decision to incorporate it into this thesis.

Consistent with Bryant and Charmaz's (2007) recommendations, throughout the course of this thesis the acronym GTM is used. Traditionally as a research approach, GTM was simply referred to as grounded theory. However, Bryant and Charmaz (2007)

have recently argued that a grounded theory is actually the resultant output or end product, which can be achieved by adopting this approach. Therefore, they adopted the acronym GTM to refer to the grounded theory method. Further to this, due to extensive epistemological debate surrounding applications of GTM (See Chapters 4 & 5), this thesis recognises the importance of differentiating between the terms "method" and "methodology" when referring to GTM. Methods describe the specific techniques and procedures used to gather and analyse data in relation to the research question or hypothesis, whereas a methodology refers to the overall plan of action or process which underpins the choice of methods (Crotty, 1998). Therefore, the acronym GTM used in this thesis refers to *the Grounded Theory Methodology* (not method), in order to differentiate between the research approach as a whole and the specific techniques adopted within this approach.

1.4 Thesis Structure

A structural diagram of this thesis is presented in Figure 1.1. The diagram clearly demonstrates that this thesis presents unique contributions to knowledge from both theoretical and methodological perspectives. These represent the two golden threads or central themes that run throughout the thesis and are depicted in Figure 1.1 by the two large arrows. To address these, the thesis is comprised of three studies. Study 1 contributes to the rationale for the theoretical strand of the thesis by providing systematic review evidence which challenges current theoretical explanations of long-term PA behaviour change. Study 2 contributes significantly to the methodological strand of the thesis by challenging applications of the chosen methodology, GTM, within exercise psychology. While the implications of Study 2 are presented as being relevant to all applications of GTM, they also went on to inform the methods and procedures adopted throughout Study 3. Study 3 represents the most significant study in this thesis whereby the GTM methodology is put into practice based on the findings of Study 2, to advance theoretical understandings of long-term PA behaviour change. Finally, the associated chapters which detail these three studies and provide any associated rationale or discussion are also highlighted by Figure 1.1.

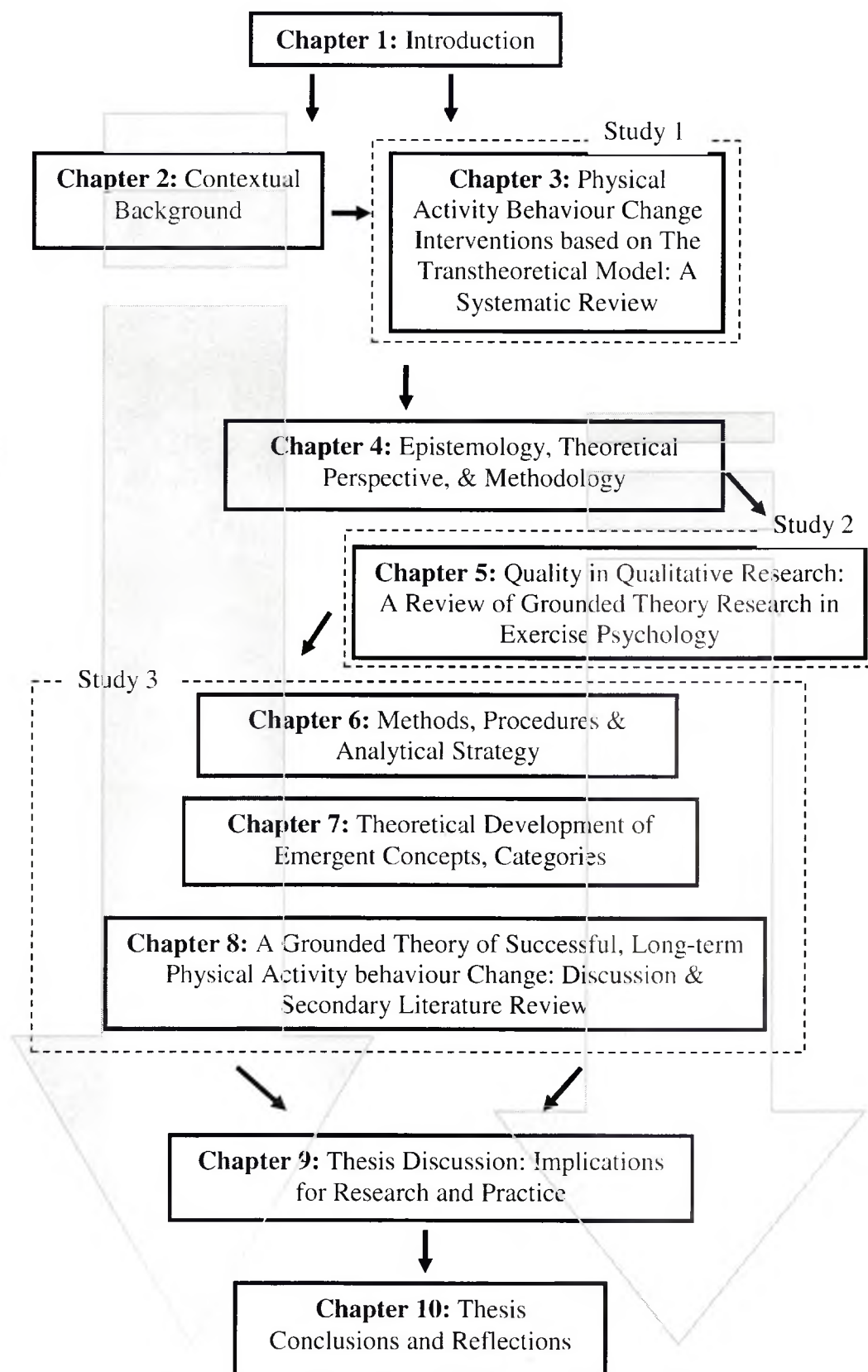


Figure 1.1 Structural Diagram of the Thesis.

To elaborate on the chapter headings presented in Figure 1.1, a brief summary of each chapter is provided overleaf:

Chapter 2

In order to present a rationale for the conceptual/theoretical thread of this thesis, Chapter 2 introduces and critically explores the PA related behaviour change literature from both an applied and theoretical perspective. Firstly, the most prominent current PA behaviour change intervention strategies are critically examined, to ascertain the efficacy of current practices. Secondly, a range of theoretical frameworks commonly used to explain PA participation and guide the development of PA interventions are critically reviewed. Based on the evidence uncovered, a rationale is presented for the development of a more comprehensive theoretical account of long-term PA behaviour change.

Chapter 3

While conducting the literature review described in chapter 2, it was revealed that the Transtheoretical Model (TTM) represented the most commonly cited theoretical framework for developing PA behaviour change interventions. However, due to observed limitations with previously conducted reviews, the efficacy of TTM based approaches had not been accurately established. Consequently, to gain a more complete picture regarding the potential of this increasingly popular theoretical approach, Chapter 3 critically explores TTM as a viable source of information for PA behaviour change intervention development. This includes conducting a systematic review of interventions reported to be based on TTM. The evidence uncovered in this chapter generates further support for the development of a more comprehensive theoretical account of long-term PA behaviour change and highlights a number of important implications for applications of theory to practice.

Chapter 4

As explained earlier in this introductory chapter, to address the implications uncovered in Chapter's 2 and 3, and develop a more comprehensive theoretical account of PA behaviour change, a decision was made to adopt GTM. To help readers understand this decision, Chapter 4 describes the epistemological assumptions, theoretical perspectives and methodological debates that were considered during the design of the current study. In describing these philosophical underpinnings, this chapter provides an in-depth justification for the chosen methodological approach (GTM) and clarifies the epistemological stance assumed. Chapter 4 also introduces the

extensive debate and associated quality control issues surrounding GTM, providing a rationale for the methodological strand of this thesis.

Chapter 5

In light of the different interpretations of GTM, a number of researchers have questioned the extent to which many studies actually follow a true GTM approach. Consequently in order to reduce confusion and further legitimise GTM as a form of enquiry within exercise psychology, Chapter 5 explores the issue of research quality or rigour for GTM based work. Guidelines for assessing GTM research are proposed based on the defining characteristics of the methodology and other published recommendations for assessing qualitative research. These are then adopted to critically review the current body of GTM based research within exercise psychology, and provide an overview of how it is being applied within this academic domain. The evidence uncovered in this chapter, provides important applied implications for both the current research project and also for future applications of GTM.

Chapter 6

Chapter 6 describes the methods and procedures used throughout this GTM study for both data gathering and analysis. Justification for the use of QSR-NVivo, a Computer Assisted Qualitative Data Analysis Software (CAQDAS) package, is also presented, along with a detailed account of how it was used to facilitate many aspects of the GTM process. Ethical issues associated with the current research are also raised and strategies for reducing any associated risk or harm are described. Ultimately, Chapter 6 contributes to providing readers with a transparent account of the research process by helping them to understand exactly how the theoretical insights presented in Chapters 7 and 8 were developed.

Chapter 7

While Chapter 6 identifies and describes the techniques and procedures implemented, it does not demonstrate how this GTM study developed using those procedures. Therefore, Chapter 7 presents a transparent account of the evolving analytical processes that led to the final grounded theory presented in Chapter 8. To achieve this, a detailed account of early concept identification and subsequent conceptual and theoretical development related procedures, is presented, with reference to the various interpretations and decisions made throughout. Ultimately, this process

leads to the development of an explanatory theoretical account of long-term PA behaviour change.

Chapter 8

Chapter 8 summarises the findings described in Chapter 7 by presenting a final refined explanatory model of successful long-term PA behaviour change. This includes presenting evidence that theoretical saturation was achieved (See Chapter 5). Having presented the final theoretical model, the chapter then begins the process of discussing the research findings. In recognition of the debate surrounding the use of prior knowledge or previous literature in GTM designs, the theoretical implications are presented alongside a more extensive secondary literature review. Therefore, in addition to discussing the findings based on how they relate to the literature described in Chapters 2 and 3, a number of additional literature sources are considered, in direct response to the emergent findings. Specifically, extensive discussion is presented which centres on the core categories and processes highlighted in the final explanatory model.

Chapter 9

Alongside the theoretical implications explored in Chapter 8, the results of the GTM study presented in this thesis also generate a number of applied implications. These are presented in Chapter 9 and centre on the how the theoretical knowledge obtained can be used to inform applied practices and ultimately enhance the efficacy of PA intervention strategies. In addition to this, implications for the methodological strand of the thesis (i.e. implications for research) are also discussed in Chapter 9. These focus on issues surrounding theory development, applications of GTM and the use of CAQDAS.

Chapter 10

Because a constructivist stance is adopted throughout this thesis to acknowledge the nature of the meaning making processes described (See Chapter 4), Chapter 10 concludes the thesis by reflecting on the research journey of the principal researcher. The purpose of this is to provide insight into how personal values and prior assumptions may have influenced the construction of knowledge in this thesis. Alongside this, the various trials and tribulations encountered during the research process are also described. This includes references to potential limitations and suggestions for future research. In presenting and discussing these reflections, this chapter compliments this PhD thesis by providing valuable contextual information, relevant to many of the processes described.

It also helps to demonstrate how the principal investigator developed as an independent researcher throughout.

Chapter 2: Physical Activity Behaviour Change - Contextual and Theoretical Background

2.1 Introduction

As explained in Chapter 1, this thesis addresses both conceptual and methodological issues within exercise psychology. To present a rationale for the conceptual issues explored in this thesis, this chapter introduces and critically explores the PA related behaviour change literature from both an applied and theoretical perspective. However, this chapter does not represent a complete review of the health and PA behaviour change literature, because it is generally agreed that it is inappropriate to conduct an exhaustive literature review too early in a GTM based study¹ (Charmaz, 2006; Glaser, 1992; Strauss & Corbin, 1998). Instead it provides a rationale for embarking both on a review of TTM based PA behaviour change interventions (See Chapter 3) and for ultimately adopting GTM to understand PA behaviour change. First, some of the most prominent intervention strategies used to encourage PA behaviour change are described and discussed. Second, a range of theoretical frameworks that are commonly used to guide the development of PA interventions are critically reviewed. Based on this information, current theoretical explanations of PA behaviour change are called into question and a rationale is presented for an in-depth examination of the TTM and its applications to PA behaviour change (Chapter 3).

2.2 Current PA Intervention Strategies

In a systematic review of interventions designed to promote PA, Kahn et al. (2002) identified three different types of intervention: those that focus on the provision of information, those that focus on using behavioural skills and social support and those that focus on making environmental and policy changes. Although these three categories were devised based on interventions designed and implemented in the USA prior to 2002, they remain representative of the majority of PA interventions developed throughout the wider research community (See Table 2.1 for examples). Within these three categories, interventions have been designed for, and applied to, a range of specific populations and environments. It is also not uncommon for interventions to incorporate more than one of the techniques identified above (e.g. Physical Activity

¹ For further discussion on incorporating literature into GTM designs see Chapter 6 (Section 5.3) and Chapter 8 (Section 8.2).

Referral Schemes (PARS)). For an overview of the different types of PA intervention strategies, with references to some examples see Table 2.1.

Table 2.1 A Descriptive Overview of Different Types of PA Intervention (adapted from Kahn et al., 2002)

Type of Intervention	Description	Examples
Informational Approaches	<ul style="list-style-type: none"> • Focus on the provision of information. • Are designed to change people's knowledge and attitudes with regards to the benefits of PA and risks associated with sedentary behaviour. • They are also used to increase awareness of opportunities for PA. 	<ul style="list-style-type: none"> ▪ Point of decision prompts ▪ Classroom based education (Focussing on information provision) ▪ Mass media campaigns
Behavioural and Social Approaches	<ul style="list-style-type: none"> • Focus on developing behavioural skills and using social support • Are designed to teach people behavioural management skills to assist with adoption and maintenance of PA behaviour change. • They also focus on creating social environments that facilitate and enhance behavioural change. 	<ul style="list-style-type: none"> ▪ Behavioural counselling ▪ Goal setting / making PA plans ▪ Creating social networks (e.g. community walking groups) ▪ Reward schemes
Environmental and Policy Approaches	<ul style="list-style-type: none"> • Focus on the provision of effective physical and organizational environments. • Are designed to provide, convenient, attractive and safe options for PA participation. 	<ul style="list-style-type: none"> ▪ Outreach programmes ▪ Provision of facilities/equipment ▪ Infrastructure changes

Despite the range of intervention approaches being developed and implemented, review evidence presents limited support for the efficacy of these current approaches (Hillsdon, et al., 2005; Kahn et al., 2002). Specifically, Hillsdon et al. (2005) produced a synthesis of 16 high quality systematic reviews and meta-analyses of intervention studies designed to increase PA among adults. This encompassed a range of interventions (e.g. PARS, brief advice, PA counselling and structured exercise programmes/classes) conducted within a variety of settings (e.g. primary and secondary healthcare, community settings, workplace settings, in the home). Overall, their results concluded that short-term changes (i.e. initiation of PA related pursuits) may be achievable using a number of current intervention strategies, but long-term changes (i.e. maintained participation) appear much more difficult to achieve. Despite this, the review evidence did suggest that a number of specific intervention characteristics may encourage longer term behavioural changes. These included: interventions based on theories of behaviour change that teach behavioural skills and are tailored to individual needs; interventions that promote moderate intensity PA and are not facility dependent;

and interventions that incorporate regular contact with an exercise specialist. However, these claims should be treated with caution because long-term findings were rarely recorded in excess of 12 months post-intervention.

Since the above findings were published, the National Institute for Health and Clinical Excellence (NICE, 2006) outlined four of the most commonly used intervention strategies for increasing PA. These were PARS, community based exercise programmes for walking and cycling, brief interventions and the use of pedometers. Therefore, within the United Kingdom (UK), these represent the most popular approaches for encouraging PA behaviour change. To understand the potential limitations associated with these current intervention techniques, the following sections explore these and other less popular approaches, and the evidence base that supports their use.

2.2.1 Physical Activity Referral Schemes and Community Based Exercise Programmes

Physical activity referral schemes refer to a process whereby patients are referred from primary care to undertake a prescribed programme of supervised PA (Gidlow et al., 2007). These programmes usually last for approximately 10 to 12 weeks (Gidlow, Johnston, Crone & James, 2005). Community based exercise programmes are also supervised PA pursuits, but they are community driven and focus on providing opportunities for members of local communities to engage in PA related pursuits together (NICE, 2006). These community programmes are often incorporated into PARS by local health authorities (See Crone, Johnston & Grant, 2004). Therefore, both PARS and community based exercise programmes represent behavioural/social and environmental/policy approaches. In addition to this, PARS also include informational elements (i.e. receiving information regarding health from a medical practitioner).

Despite a rapid increase in the number of PARS and community exercise programmes, there is no solid evidence base for their effectiveness (Dugdill, Graham & McNair, 2005; Harrison, Roberts & Elton, 2005). Research evidence highlights that adherence to these schemes after initial referral can as low as 20-30% (Dugdill et al., 2005; Gidlow et al., 2005; Munroe, Nicholl, Brazier, Davey & Cochrane, 2004) and any increases in PA levels are rarely sustained over time (Morgan, 2005). There is also evidence to suggest that PARS may only address the needs of specific populations and as a result not benefit all individuals (Gidlow et al., 2007; Morgan, 2005). For example, Morgan (2005) revealed that PARS may only increase PA levels in individuals who are

already slightly active, older adults, and those who are overweight but not obese. Consequently, the Public Health Interventions Advisory Committee (PHIAC) determined that there was insufficient evidence to recommend the use of PARS and community based exercise programmes to promote PA (NICE, 2006). This is particularly concerning since PARS are arguably the most prevalent primary care based PA interventions in the UK (Crone et al., 2004). Therefore, a process of providing individuals with increased PA opportunities and related information/advice, does not necessarily lead to sustainable increases in PA participation.

Many PARS advocates assume that patients are motivated to exercise as a consequence of receiving advice from their GP, and as a result will initiate and maintain activity with minimal support (McKenna, Naylor & McDowell, 1998). However, the research evidence described previously appears not to support this assumption, because despite receiving advice many people still lack the ability to make sustainable lifestyle changes (Dugdill et al., 2005; Gidlow et al., 2005; Munroe et al., 2004). Therefore, the provision of advice may not be sufficient on its own to bring about significant behavioural changes. Consequently, PARS may need to incorporate much more to adequately encourage and support patients through the PA behaviour change process. For example, Morgan (2005) presented evidence to suggest that levels of activity intensity and patient contact may directly influence effectiveness. Specifically, non UK PARS involved increased patient contact with health professionals and were of a greater intensity than UK based schemes, and these non UK based schemes generally reported better results. Evidence has also been presented to suggest that health professionals may need to consider the appropriateness of their referrals for specific individual patient characteristics, such as their medical conditions or their readiness to change (Johnston, Warwick, De Ste Croix, Crone & Sidford, 2005). Based on these findings, current PARS and community exercise programmes may not be specific enough solutions for encouraging successful PA behaviour change because they fail to recognise the full range of complexities associated with PA behaviour change.

2.2.2 Brief Interventions

An alternative to PARS and community based exercise programmes are brief interventions in primary care. Dunn and Rollnick (2003) describe brief interventions as a generic approach that refers primarily to patient encounters where time is limited and brief advice is the only possibility. Brief interventions involve opportunistic advice, discussion, negotiation or encouragement delivered by health professionals within

routine consultations. While brief interventions cannot be described as counselling, they often involve counselling related skills such as reflective listening and rolling with resistance (Dunn & Rollnick, 2003) because they were originally adapted from the client centred counselling style of motivational interviewing (MI: Miller & Rollnick, 2002). As a result, brief interventions can be both informational and behavioural/social in nature.

There is considerable research support for the use of brief interventions across a range of health promotion and behaviour change settings including alcohol addiction (e.g. Bertholet, Daeppen, Wietlisbach, Fleming & Burnand, 2005; Flemming & Manwell, 1999) and smoking cessation (Lancaster, Stead, Silagy & Sowden, 2000). However, although PHIAIC determined that there is sufficient evidence to recommend the use of brief PA interventions in primary care (NICE, 2006), rather surprisingly, there appears to be limited published research evidence to support this decision. In 2001, a review of brief interventions in primary care revealed little evidence to suggest that they bring about sustained changes in PA habits (Lawler & Hanratty, 2001). Specifically, there was evidence to suggest that they may lead to modest short term (< 6 weeks) increases in PA participation (e.g. Bull & Jamrozik, 1998; Calfas et al., 1996) but there was little evidence to support their long-term efficacy. Since then only a limited number of intervention studies have examined the efficacy of brief PA interventions in primary care (e.g. Hillsdon, Thorogood, White & Foster, 2002; Marshall, Booth & Bauman, 2005; Pinto, Goldstein, Ashba, Sciamanna & Jette, 2005), presenting further mixed support for their efficacy. More recently, the quality of many counselling and brief advice based interventions for encouraging PA behaviour change has been called into question (Breckon, Johnston & Hutchison, 2008). Specifically, due to variations in the content and style of many brief interventions, it is difficult to make comparisons between them and ultimately comment on their efficacy. It is also important to stress that most of the research evidence available is non UK based and was conducted in a range of different international public health settings. Therefore, these findings may not be applicable to UK primary healthcare settings (Lawler & Hanratty, 2001). Overall, evidence suggests that brief PA interventions may lead to short term increases in PA levels but rarely lead to sustained lifestyle changes. Based on this, it seems surprising that the PHIAIC deem there to be sufficient evidence to recommend the use of brief PA interventions in primary care. However, because the role of PHAIC is to consider and interpret evidence on both the efficacy and cost

effectiveness of public health interventions (PHAIC, 2008), this decision will also have taken into account their financial viability.

2.2.3 Other Intervention Strategies

In addition to those already described, a number of other techniques are often incorporated into PA interventions, to help encourage successful change. Among these are motivational or monitoring tools such as pedometers or exercise diaries, which have often been included in intervention designs as a means of providing personal feedback (Bravata et al., 2007). Although the PHIAIC determined that there was insufficient evidence to recommend the use of pedometers (NICE, 2006), a more recent systematic review does present evidence to suggest that the use of pedometers is associated with significant increases in PA and significant decreases in body mass index and blood pressure (Bravata et al., 2007). However once again, there was limited evidence to suggest that pedometers alone can lead to sustainable PA behaviour change. In addition, many of the reviewed studies incorporated additional methods and techniques into their intervention protocols (e.g. counselling sessions or telephone reminders), and it was not always clear what the relative influence of these additional techniques was.

Finally, an increasing body of evidence supports the use of PA counselling in a variety of health care settings (e.g. McKenna & Vernon, 2004; Melanson, Dell' Olio, Carpenter & Angelopoulos, 2004; Kirk, MacIntyre, Mutrie & Fisher, 2003). However, as explained previously, a recent review article revealed a number of inconsistencies with regards to the design and delivery of many previously developed interventions (Breckon et al., 2008). For example, few studies detailed the frequency or duration of the counselling intervention protocols and interventions were based on a wide range of theoretical frameworks. Therefore, while PA counselling represents a potentially useful method of encouraging PA behaviour change, due to these methodological inconsistencies, it is very difficult to draw more finite conclusions regarding the efficacy of these interventions.

In summary, the PA behaviour change literature reveals a diverse collection of intervention approaches and techniques, designed to target specific populations. Further to this, empirical evidence demonstrates that many of these individual, group and community level interventions have proven short-term benefits, (e.g. increased uptake in PA related pursuits and short-term increases/improvements in self-reported PA levels). However, in order to encourage people to engage in regular, sustainable PA, the evidence suggests that interventions still need to address maintenance of these short

term changes (Hillsdon et al., 2005). Consequently, there appears to be a need for further research into the development of long-term PA behaviour change and relapse prevention intervention strategies. To explore the future research possibilities in this area further, the remainder of this chapter focuses on the theoretical understandings of PA behaviour change that inform many of the interventions described above.

2.3 Theoretical Approaches to PA Behaviour Change

In order to develop effective PA behaviour change interventions, it is logical that researchers need firstly to understand the dynamics of how people change. To achieve this, a number of theoretical explanations are regularly cited in the PA behaviour change literature. These are adopted to help identify the correlates and processes associated with human behaviour change. Biddle and Mutrie (2008) summarise four types of PA correlates: personal/demographic, psychological, social and environmental. To identify and explore these in more detail, the field of exercise psychology has adopted well-known motivational, health and social psychology theoretical approaches. By providing insights into how people change, these theoretical approaches are being used to inform both the design and delivery of PA behaviour change interventions. However, because there is no single theory or model which specifically explains how best to assist individuals in adopting habitual PA behaviours (Marcus & Forsyth, 2003), a range of different models and theories are regularly incorporated into the PA behaviour change research literature.

Traditionally, theoretical approaches to health related behaviour change have focussed on psychological and social determinants. Consequently, many of these theoretical frameworks are commonly described as social cognition models (Connor & Norman, 2005). These approaches focus on individual cognitions or thoughts, as processes which intervene between observable stimuli and responses in real world situations (Fiske & Taylor, 1991). However, it has been suggested that health behaviour change research has focussed too much on social cognition models and their practical utility or applied value has been questioned (Jeffery, 2004). Specifically, Jeffery highlighted that limited empirical support for these approaches has been observed, and the extent to which the variables they describe are accessible to observation and experimental manipulation was also called into question. As a result, alternative theoretical approaches, such as the more applied 'stage' based models have become increasingly popular.

In order to explore the application of theoretical approaches within exercise psychology, the remainder of this chapter critically examines the literature surrounding the use of theory within an exercise and PA behaviour change context. The choice of models and theories presented in this chapter is dictated by meta analytical evidence (e.g. Marshall & Biddle, 2001), systematic review based evidence (e.g. Breckon, et al., 2008; Marcus & Forsyth, 2003) and governmental reports on PA and behaviour change (e.g. Foster, Hillsdon, Cavill, Allender & Cowburn, 2005; United States Department of Health and Human Services (USDHHS), 1996), which indicate the most commonly adopted theoretical frameworks in exercise psychology and PA behaviour change.

To account for the different theoretical approaches that have been adopted within exercise psychology, Biddle and Mutrie (2008) have described them as falling into five categories: belief/attitude theories, control based theories, competence based theories, stage based theories and hybrid models (See Table 2.2). The current chapter adopts these categories as a framework for exploring different theoretical approaches within exercise psychology. Within these theoretical categories, it is important to differentiate between the terms "model" and "theory". A theory represents a set of concepts, definitions, and propositions that explain or predict a phenomenon by illustrating processes or relationships between variables (USDHHS, 2005). A model however, does not attempt to explain processes, only represent them (USDHSS, 2005). Therefore, models are descriptive in nature (i.e. are concerned with classification or with identifying characteristics/attributes) whereas theories are explanatory (i.e. are concerned with providing explanation). To acknowledge this distinction, I have adapted the labels for the categories highlighted by Biddle and Mutrie (2008) to demonstrate that they represent theoretical approaches, which include both models and theories.

Table 2.2 Categories of Exercise Behaviour Theoretical Approaches (adapted from Biddle & Mutrie, 2008)

Theoretical Approaches of Exercise Behaviour	Description	Example
• Beliefs/attitude based	Theories that address the relationship between beliefs, attitudes, intention and behaviour.	Theory of planned behaviour
• Control based	Theories that focus on perceptions of control and choice and their relationship with behaviour.	Self-determination theory
• Competence based	Theories that focus on perceptions of competence and confidence and their relationship with behaviour.	Self-efficacy theory
• Stage based	Theories that recognise distinct behavioural stages and the determinants that relate to those.	Transtheoretical model
• Hybrid approaches	Theories that combine linear and stage based approaches.	The health action process approach

2.3.1 Belief/Attitude Based Approaches

It is relatively common for PA behaviour change interventions to target both individual and societal attitudes and beliefs surrounding PA participation. Many of these interventions have their roots in theoretical approaches that assume behavioural actions to be closely related to personal feelings and beliefs (Kahn et al., 2002). A number of theoretical accounts have been proposed to explain human behaviour from this perspective. Within the generic health behaviour change literature, some of the most commonly referred to are: the Health Belief Model (Janz & Becker, 1984; Rosenstock, 1974), the Theory of Reasoned Action (TRA: Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the Theory of Planned Behaviour (TPB: Ajzen, 1985; 1991) and the Protection Motivation Theory (Rogers, 1983). However, within the exercise psychology and PA behaviour change literature much of the research has focussed on the TRA and TPB. Therefore, this section will focus on critically examine these, to establish what the PA behaviour change literature has learnt from them, what their limitations are and what gaps are still evident in the literature.

2.3.1.1 The Theory of Reasoned Action

The TRA (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) is concerned with "the causal antecedents of volitional behaviour" (Ajzen, 1988: p. 117). It suggests that a person's behaviour is determined by his/her intention (an indication of a person's readiness) to perform the behaviour and that this intention is, in turn, a function of his/her attitude toward the behaviour and his/her subjective norm (Hagger, Chatzisarantis & Biddle, 2002). Attitudes refer to the beliefs held about the specific behaviour, including an evaluation of the likely outcomes; whereas the subjective-norm component refers to the beliefs of significant others and the extent to which one is motivated to comply with these (See Figure 2.1 for an overview of the TRA).

Previous meta-analytical evidence offers reasonable support for the TRA in PA contexts, particularly for the predictive power of the attitudinal component (Hagger et al., 2002; Hausenblas, Carron & Mack, 1997). Specifically, results suggest that the attitudinal component appears to be influential in predicting PA intentions, which in turn have been shown to predict behaviour to a slightly lesser extent. However, the normative component has not been shown to be a particularly strong predictor of PA intentions. Despite these findings, there is very little evidence to suggest that TRA has been used to develop PA behaviour change interventions. Based on the above findings, PA interventions should focus on altering both beliefs and perceptions of PA outcomes in order to bring about behavioural changes by strengthening peoples intentions to change. However, while this appears simple enough, the model does not demonstrate how to bring about such changes. While the TRA identifies some potential determinants of PA (i.e. behavioural & normative beliefs), its theoretical depth appears limited because it provides little insight into the development of these. Consequently, TRA does not assist researchers in understanding how behavioural and normative beliefs might be altered to bring about successful change.

In addition to the difficulties associated with applying the TRA to PA intervention designs, a number of further limitations have been identified, which appear to impact on its ability to account for successful PA behaviour change. First, the model focuses on cognitions and therefore does not account for other external determinants such as environmental influences (Biddle & Mutrie, 2008). Second, it was only developed to account for behaviours under volitional control (Ajzen, 1988) and arguably, due to the influence of a number of potential behavioural barriers (e.g. time, work responsibilities, provision of facilities), PA is rarely under complete volitional

control. To account for this Ajzen (1985; 1991) proposed an extension of the TRA called the Theory of Planned Behaviour (TPB).

2.3.1.2 The Theory of Planned Behaviour

The TPB incorporates the additional variable of perceived behavioural control, which reflects people's confidence in their own ability to carry out a particular behaviour (Armitage, 2005). It is suggested that the perceived behavioural control variable influences both intentions and behaviour. For example, an individual may want to participate in PA because they believe it will benefit their health, but if there are environmental barriers that are outside of their control, then they are unlikely to participate regardless of their attitudes. The TPB also posits that perceived behavioural control is underpinned by control beliefs, which refer to the perceived presence of factors that may facilitate or act as barriers to the behaviour and the perceived impact of these (Ajzen, 1991). Therefore, perceived behavioural control accounts for the personal and environmental factors that can influence behaviour. Additionally, the TPB suggests that as well as influencing intentions, perceived behavioural control can also directly impact on behaviour because perceived control will only predict behaviour when it closely approximates actual control (Hagger et al., 2002). See Figure 2.2 for a summary of TPB). Arguably TPB is more appropriate for studying PA than the TRA due to the wide range of potential barriers to being physically active (Biddle & Mutrie, 2008).

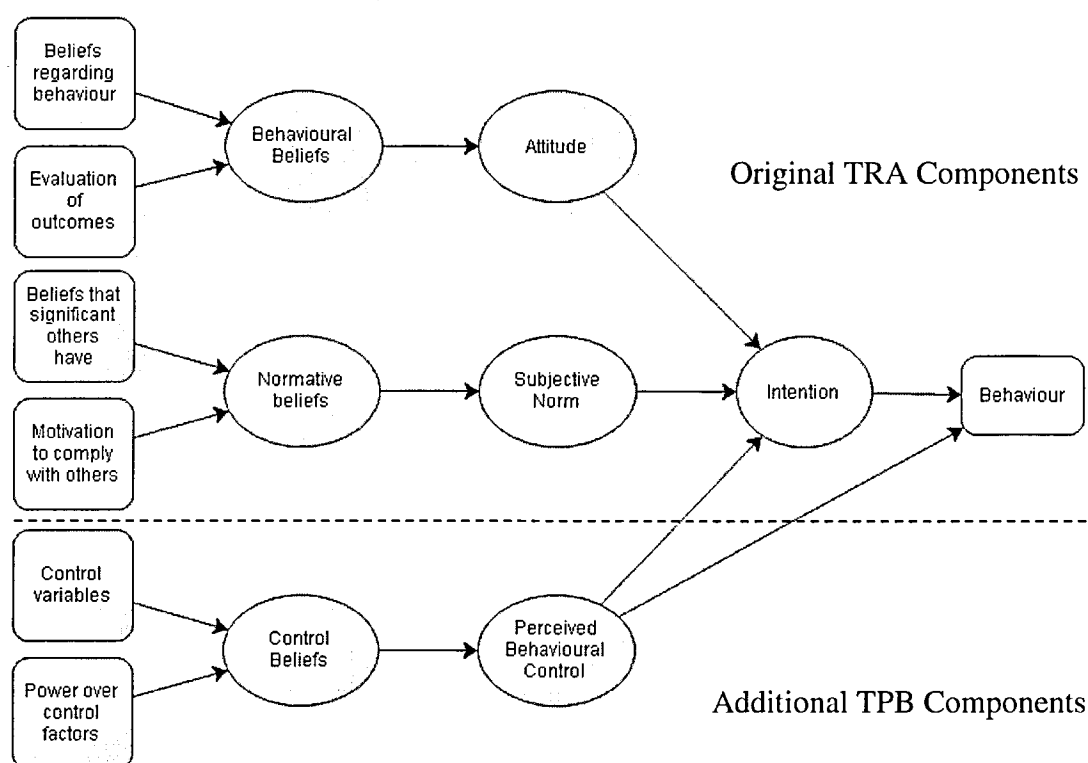


Figure 2.1 The Theories of Reasoned Action and Planned Behaviour (adapted from Biddle & Mutrie, 2008 & Connor & Norman, 2005)

Evidence from Hagger et al's (2002) meta analysis offered some support for the TPB within PA. Specifically, perceived behavioural control was influential in predicting intentions, but intention remained the only direct predictor of behaviour. From an applied perspective, TPB suggests that as well as altering beliefs and perceptions of PA outcomes, to bring about behavioural changes, interventions need to focus on encouraging greater levels of control over that behaviour. Consequently, some intervention strategies have focussed on reducing potential barriers to PA (e.g. community based schemes designed to make PA more accessible). However, while such approaches may encourage greater perceptions of control, (See Section 2.1), they do not always result in positive behavioural outcomes. A possible explanation for this is that many community based programmes do little more than provide opportunities for PA participation (NICE, 2006) and as a result only address the perceived behavioural control component of TPB. This highlights an important implication for all applications of theory to practice, by stressing the need to acknowledge all facets of the chosen theory. As explained previously, the different dimensions of a theory and their proposed relationships are what give them their explanatory value. Therefore, to accurately

develop theory driven approaches, it is crucial to acknowledge all elements of the underpinning theoretical accounts.

Another criticism directed at the application of both the TRA and TPB for PA behaviour change, concerns the fact that they are both considered deliberate processing models, which imply that peoples attitudes and subsequent behaviours occur after careful consideration of available information (Connor & Norman, 2005). For this reason they may not account for habitual behaviours such as sustained participation in PA where the decision making process becomes less conscious. Consequently, in order to understand such behaviours, it may be necessary to consider how and why our behavioural actions and intentions develop over time.

While the TRA and the TPB have undoubtedly contributed to our understanding of PA correlates, they still do not adequately account for adoption of PA as a habitual behaviour. They are also limited as comprehensive explanatory theoretical accounts because they fail to fully describe the development of a number of the specified variables (e.g. the different types of subjective beliefs). As a result, their contribution towards the development of PA behaviour change interventions is limited. Consequently, it may be necessary to consider alternative theoretical approaches in order to gain an appropriate level of theoretical insight into the phenomenon of successful PA behaviour change.

2.3.2 Control Based Approaches

The second group of theoretical approaches identified by Biddle and Mutrie (2008) are those that address motivation through feelings of control. These theories posit that control represents an important indicator of motivation. To explain how control may impact on motivation, a number of psychological constructs are commonly referred to. These include locus of control, intrinsic motivation, attributions and self-determination (Biddle, 1999). One theoretical approach that addresses these constructs is Self-Determination Theory (SDT: Deci & Ryan, 1985; Ryan & Deci, 2000). Due to SDT's increasing popularity within PA and exercise (Hagger & Chatzisarantis, 2007), this section will attempt to critically focus on how SDT has been applied to understanding PA participation and how this knowledge can or has been used to influence intervention designs.

2.3.2.1 Self Determination Theory

The SDT has been described as a "theory of personality development and self-motivated behaviour change" (Markland, Ryan, Tobin & Rollnick, 2005: p.815). Ryan and Deci (2007) suggest that SDT is becoming increasingly important in the field of sport and exercise because it is a theory of human motivation that both acknowledges spontaneous, intrinsically motivated activity and pinpoints the factors that either enhance or debilitate it. By addressing more spontaneous intrinsically motivated behaviour, it may go some way to addressing more long-term sustained behavioural actions. Therefore, SDT appears to represent a valuable resource for those wishing to encourage sustainable PA behaviour change.

Self Determination Theory posits that people have an innate organisational tendency toward growth, integration of the self, and the resolution of psychological inconsistency (Ryan & Deci, 2000). However, this natural human tendency requires ongoing support from the social environment in order to function effectively (Hagger, & Chatzisarantis, 2007). Specifically, SDT describes three basic psychological needs (Basic Needs Theory), which if satisfied, will facilitate the optimal functioning of the processes mentioned above, but if thwarted, will hinder these. These are:

- The need for competence (feeling efficacious)
- The need for relatedness (feeling belongingness and connectedness with others)
- The need for autonomy (feeling volitional)

In addition, to the basic needs theory, SDT has evolved through the development of three additional mini-theories, intended to explain different motivationally based phenomena (Ryan & Deci, 2002). These are: the Cognitive Evaluation Theory, the Organismic Integration Theory and the Causality Orientations Theory.

Central to SDT is intrinsic motivation, which refers to an "inherent tendency to seek out novelty and challenges, to extend and exercise ones capabilities to explore and to learn" (Ryan & Deci, 2000: p.70). Within PA, the literature suggests that intrinsic motivation is associated with positive psychological outcomes and greater exercise adherence (Markland & Ingledew, 2007). Therefore, if it is possible to understand how people develop this type of motivation, PA intervention strategies are likely to benefit from this knowledge. The cognitive evaluation theory component of SDT attempts to describe factors that explain variability in intrinsic motivation. It focuses on the fundamental needs for competence and autonomy, proposing that social, contextual

events (e.g. feedback, communications, rewards) that promote feelings of competence during action, can enhance intrinsic motivation for that action (Ryan & Deci, 2000). Cognitive evaluation theory also specifies that feelings of competence will not enhance intrinsic motivation unless accompanied by a sense of autonomy. Finally, a sense of relatedness or security may also enhance intrinsic motivation (Ryan & Deci, 2000). Therefore, the cognitive evaluation theory suggests that social environments can facilitate or inhibit intrinsic motivation by supporting or thwarting people's innate psychological needs.

While, intrinsic motivation is an important element of SDT, the theory recognises that it is not the only type of motivation (Deci & Ryan, 1985). In fact Ryan and Deci (2000) suggest that much of what people do is not actually intrinsically motivated, due to various social and environmental influences. However, rather than treat all behaviours that acquire motivation from these external sources as extrinsic, SDT introduces a second sub-theory to differentiate between different types of extrinsic motivation (Deci & Ryan, 1985). The organismic integration theory presents a continuum of motivational types ranging from amotivation, through four different types of extrinsic motivation, to intrinsic motivation. These are all based on the degree to which the motivations emanate from the self (See Figure 2.2). As people internalise regulations and assimilate them to the self, SDT hypothesises that they experience greater autonomy in action. The organismic integration theory proposes that internalisation is more likely to be in evidence when there are ambient supports for feelings of relatedness and where feelings of competence are enhanced. Therefore, in order to bring about sustainable PA participation, both the cognitive evaluation theory and the organismic integration theory components of SDT propose that individuals need to display greater autonomy in their PA participation. To achieve this they may need to experience greater supports for competence, autonomy and relatedness. Consequently, according to SDT intervention strategies need to be designed with this in mind.

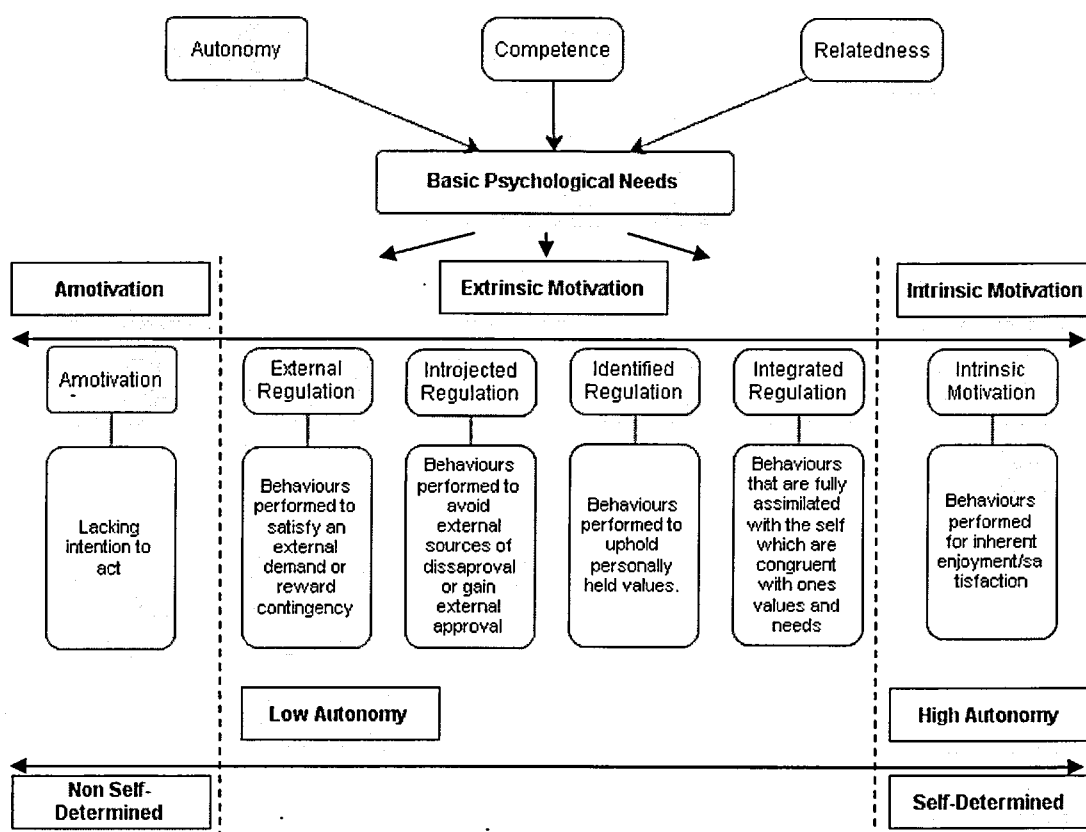


Figure 2.2 An overview of SDT (adapted from Hagger & Chatzisarantis, 2007 & Ryan & Deci, 2002)

In addition, Deci and Ryan (1985) formulated the causality orientations theory to describe individual differences in people's tendencies towards self-determined behaviour and their orientations towards environments that can support this. Three different motivational orientations are proposed. First, *autonomy orientation* involves a high degree of experienced choice with respect to the initiation and regulation of one's own behaviour. Autonomy orientated people seek out opportunities for self-determination and choice, and can be described as having a generalised tendency towards an internal perceived locus of causality (Ryan & Deci, 2002). Therefore, autonomy orientated people may be more likely to be intrinsically motivated, and less likely to be controlled by extrinsic rewards. Second, *control orientation* involves people's behaviour being organised with respect to controls either in the environment or inside themselves. When control orientated, people seek out, select or interpret events as controlling (Ryan & Deci, 2002). As a result, individuals who are highly control orientated tend to do things because they think they should, and extrinsic rewards may play a more determinative role in their behaviour. Finally, *impersonal orientation* involves experiencing behaviour as being beyond intentional control. They tend to

believe that they are unable to regulate their behaviour in a way that will lead reliably to desired outcomes. When high on impersonal orientation, people possess low self esteem and are unable to master situations (Deci & Ryan, 2002). Therefore, the causality orientations theory hypothesises that the strength of peoples' causality orientations will explain a significant amount of variance in their behaviours. Based on this, PA behaviour change interventions need to be flexible enough to account for these potential differences.

Clearly, the SDT represents a promising theoretical framework for understanding PA participation because it accounts better for behaviours such as mastery attempts, curiosity, exploration and play (i.e. intrinsically motivated behaviours), all of which may be associated with sustained participation. However, while there is empirical support for the facets of SDT within sport and PA (e.g. Chatzisarantis, Hagger, Biddle, Smith & Wang, 2003; Ntoumanis, 2001; Vallerand & Fortier, 1998), there is very little evidence to suggest that it is being used to influence PA behaviour change interventions. Probably, the most significant applied implication from the SDT and PA literature is to encourage more self-determined forms of motivation. However, other than by satisfying the three basic psychological needs, it is not clear how this might be achieved within a PA behaviour change context. Therefore, if SDT is going to be used to inform the development of PA behaviour change interventions, further research may need to be conducted or alternative theoretical approaches may need to be considered, in order to identify how these psychological needs can be satisfied within PA behaviour change settings. Also, because SDT represents a theoretical account of generic motivational states and their determinants, it does not specifically account for the dynamics of long-term change, in behavioural contexts such as PA.

2.3.3 Competence Based Approaches

Another type of theoretical approach, which is closely related to those based on attitudes and beliefs, are those that focus on perceptions of competence and confidence. These emphasise the motivational influence of constructs such as self-efficacy, perceptions of self-worth and success, and self-esteem. Therefore, they do complement attitude and belief based theories like the TRA and TPB because when formulating beliefs about the outcome of a particular behaviour, perceptions of competence and confidence are likely to be influential. They also contribute to the SDT, because competence was identified as being one of the three basic psychological needs.

A range of self-perceptions have been identified as important determinants or sub-domains of perceived competence or perceptions of physical self-worth (Fox, 1990; 1997). If individuals perceive competence within a certain domain (e.g. sport competence), they are hypothesised to be more likely to demonstrate that competence (i.e. participate in that particular activity). It has also been suggested that a lack of positive self-perceptions may be a key determinant of sedentary behaviour (Fox, 1997). Therefore, individuals are likely to avoid situations where a perceived lack of competence or physical self-worth may be exposed. Based on this, PA behaviour change interventions may need to recognise self-perceptions as an important determinant of change. Specifically, intervention strategies should avoid situations which may foster negative self-perceptions and consider ways to facilitate an increase in positive self-perceptions.

Further to this, research has demonstrated a need to consider how individual achievement related orientations impact on individual self-perceptions (Duda, 2001). For example, outside of exercise and PA, a distinction has been made between those who are ego (i.e. motivated to demonstrate superiority over others) and task orientated (i.e. motivated by feelings of mastery) and it has been suggested that these are closely related to how people interpret competence (Nicholls, 1989). Research within a PA context has observed individual differences in peoples achievement related orientations, and demonstrated that these different orientations are associated with different competence related self-perceptions (Biddle, Wang, Kavussanu & Spray, 2003; Wang & Biddle, 2001). Consequently, for intervention strategies to facilitate an increase in positive self-perceptions, they may need to be sensitive to different motivational orientations. However, the research evidence that supports this has generally focused on child populations, therefore further research may be required before this theoretical knowledge can be applied to adult targeted interventions.

2.3.3.1 Self-Efficacy Theory

An alternative theoretical approach that has received considerable attention in the exercise and PA related literature is self-efficacy theory (Bandura, 1977). Self-efficacy refers to situation specific self-confidence and has been defined as "the belief in ones capabilities to organise and execute the courses of action required to manage prospective situations" (Bandura, 1995: p.2). Therefore, self-efficacy theory is not concerned with outcome expectations (e.g. the belief that PA will improve a person's quality of life) like TRA/TPB but with beliefs related to the ability to carry out

behaviours. Consequently, it is closely related to people's perceptions of their own competence. Research evidence has highlighted self-efficacy as being both a consistent predictor and outcome of PA (McAuley & Blissmer, 2000; McAuley, Jerome, Marquez, Elavsky & Blissmer, 2003; McAuley et al., 2006). It has been demonstrated that self-efficacy has been shown to be a significant determinant of PA adoption (Oman & King, 1998) and maintenance (McAuley, 1993; McAuley, Jerome, Elavsky, Marquez & Ramsey, 2003) in older adults. Consequently, interventions designed to target self-efficacy may represent important ways of encouraging long-term exercise adherence.

To assist researchers in developing interventions designed to target self-efficacy, Bandura (1997) identified four sources of efficacy information. These are: performance accomplishments or mastery experiences, vicarious experiences (e.g. observing others), verbal or social persuasion and physiological states. Biddle and Mutrie (2008; p.110) provide a useful summary of the applied implications or intervention possibilities using these sources of efficacy information. Specifically, they refer to strategies which are intended to target the four sources of efficacy information within PA or exercise contexts. However, despite these clear implications, there are few examples of self-efficacy targeted interventions for PA (e.g. Allison & Keller, 2004; Dishman et al., 2004). These have generally focussed on adolescent or older adult populations and have demonstrated that self-efficacy does appear to be an important variable to target in interventions designed to encourage or increase PA participation. However, all of these studies reported short term PA outcomes so do not provide any insight into its potential role in long-term change.

Arguably, self-efficacy theory compliments many of the other theoretical approaches described in this chapter because it describes an additional perceived competence related dimension, which appears to impact on peoples beliefs/attitudes and intentions regarding PA participation. As a consequence, it is increasingly being recognised as a dimension within a number of theoretical approaches, including SDT and TTM, and is often described within associated intervention designs. Overall, competence based theoretical approaches do appear to add significant theoretical insight into the potential processes and determinants associated with PA adoption and maintenance. Consequently, variables such as self-efficacy and perceived competence may represent important dimensions, which need to be included in theoretical accounts of PA behaviour change. There also may be a need to differentiate between PA adoption and maintenance to fully understand the relevance of such variables.

2.3.4 Stage Based Approaches

Another set of models frequently cited in health behaviour change research are stage based approaches. These focus on the idea that behaviour change occurs through a series of qualitatively different stages. The most prominent of these is the TTM (Prochaska, 1979; Prochaska & DiClemente, 1983), which is often referred to as an integrative model of behaviour change (Velicer, Prochaska, Fava, Norman & Redding, 1998). Within PA, meta-analytical and systematic review based research evidence (e.g. Breckon et al., 2008; Marshall and Biddle, 2001; Marcus and Forsyth, 2003) suggest that the TTM is the most commonly adopted theoretical framework and is regularly cited in the development of PA interventions.

2.3.4.1 The Transtheoretical Model

The TTM is made up of four dimensions: the stages of change, the processes of change, self-efficacy/temptation and decisional balance. The stages of change are often described as the core organising dimension of the model (Velicer et al., 1998) and represent ordered categories along a continuum of motivational readiness (Prochaska, DiClemente & Norcross, 1992). The five stages are pre-contemplation, contemplation, preparation, action, and maintenance. Pre-contemplation is the stage at which there is no intention to change behaviour in the foreseeable future, often because individuals are unaware of their problems. Contemplation is the stage in which people are aware that a problem exists and are seriously thinking about overcoming it but have not yet made a commitment to take action. Preparation is characterised by an intention to take action in the near future. The action stage is the stage in which individuals modify their behaviour, experiences, or environment in order to overcome their problems. Finally, maintenance is the stage in which people work to prevent relapse and consolidate the gains attained during action (Prochaska et al., 1992).

To explain how individuals move through these stages another major dimension of TTM is the processes of change (See Table 2.3). These are ten strategies that describe the techniques that individuals use to modify their thoughts feelings and behaviour. Prochaska and Norcross (1994) describe the processes of change as the covert or overt activities that people engage in to alter affect, thinking, behaviour, or relationships related to particular problems or patterns of living. The first five processes of change are commonly classified as experiential. These experiential processes generally involve personal cognitions or experiences in the form of observations and realisations about the problem behaviour. Experiential processes have been shown to be used primarily during

the earlier stages of change (Velicer et al., 1998). The last five processes of change are labelled behavioural and are generally more action orientated. Behavioural processes are used primarily for later stage transitions (Velicer et al., 1998).

Table 2.3 The Processes of Change (adapted from Velicer et al., 1998; Marcus, Rossi, Selby, Niaura & Abrams, 1992)

Processes of Change: Experiential	PA Related Example
1. Consciousness Raising [Increasing awareness]	I recall information people have given me on the benefits of PA
2. Dramatic Relief [Emotional arousal]	I react emotionally to warnings about the health hazards of inactivity
3. Environmental Re-evaluation [Social reappraisal]	I consider the view that my sedentary lifestyle provides a poor example to others
4. Social Liberation [Environmental opportunities]	I find society changing in ways that make it easier to be more physically active
5. Self Re-evaluation [Self reappraisal]	I get frustrated with myself if I don't exercise
Processes of Change: Behavioural	
6. Stimulus Control [Re-engineering]	I keep things in my home that remind me of PA
7. Helping Relationships [Supporting]	I have someone who can provide feedback about my PA habits
8. Counter Conditioning [Substituting]	I try to substitute sedentary actions with alternative PA related behaviours
9. Reinforcement Management [Rewarding]	I reward myself when I attain my weekly PA targets
10. Self-Liberation [Committing]	I make commitments to change my PA habits

A study by Marcus et al. (1992) applied the stages and processes of change to PA adoption and maintenance to determine which processes people used when in different stages of PA behaviour change. The results revealed that in their efforts to modify exercise behaviour, study participants utilized all ten processes of change. However, unlike smoking cessation, use of behavioural processes did not decline as individuals progressed from action through to maintenance. This seems to suggest that PA behaviour change requires a more continuous effort in order to maintain any changes made. This may be due to the fact that the physiological needs and cravings associated with smoking cessation eventually decline whereas the barriers associated with PA behaviour change are more enduring. Marcus et al. (1992) also found that the use of experiential processes peaked in the action stage for PA adoption compared to the preparation stage for smoking cessation. A meta-analysis of TTM applications to PA

identified similar findings, concluding that the stages and processes of change can be applied to PA adoption (Marshall & Biddle, 2001). However, evidence from this analysis suggested that the stage-by-process interactions, observed in smoking cessation, are not evident in PA. Therefore, while there appears to be support for the TTM for PA adoption, the relationship between the stages and processes of change has not been shown to be consistent with the models original predictions based on smoking cessation.

In addition to the stages and processes of change the model also incorporates a number of intermediate/outcome measures in addition to the actual target behaviour. The first of these is the self-efficacy/temptation construct. Within TTM, self-efficacy represents the situation specific self-confidence that people have that they can cope with behaviour change without relapsing. This construct was adapted from Bandura's self-efficacy theory (Bandura, 1977). The temptation measure (DiClemente, 1981, 1986) reflects the intensity of urges to engage in a specific behaviour when in the midst of difficult situations (Velicer et al., 1998). Therefore, it is effectively the inverse of self-efficacy. Predictably, self-efficacy has been shown to increase from pre-contemplation through to maintenance as temptation decreases (Velicer et al., 1998). The decisional balance construct refers to the relative weighting of the pros and cons of change and represents a simplified version of Janis and Mann's (1977) model of decision making. Research demonstrates that for PA adoption, the cons of PA far outweigh the pros during pre-contemplation. In contemplation and preparation the two scales are more or less equal and in the advanced stages of change (action & maintenance) the pros outweigh the cons (Prochaska et al., 1994).

2.2.4.2 Applying TTM

Using all these dimensions of the model, Prochaska and Norcross (2001) explain that both the therapy relationship and treatment intervention can be tailored to meet an individual's specific needs based on their stage of change. For example, if a person is classified as a pre-contemplator, research has highlighted that processes such as 'consciousness raising' and 'dramatic relief' need to be emphasised in order to encourage stage progression (Prochaska & Velicer, 1997). Therefore, an appropriate intervention strategy might be to provide information about the risks associated with an individual's current health behaviour in order to increase their awareness (consciousness raising) and arouse negative emotions (dramatic relief) towards their current behaviour. To monitor any resultant changes and adapt the intervention accordingly, ongoing assessments of decisional balance and/or self efficacy might also be conducted. Consequently, TTM

provides both researchers and practitioners with a wealth of information regarding how people modify or change their behaviours. By incorporating the stages of change as a key organising dimension, the TTM is particularly appealing because not only does it guide researchers to specific change strategies, through the processes of change, but it also identifies when specific strategies should be implemented. Therefore, it is easy to see why the model has become so popular within behaviour change.

2.2.4.3 Criticisms of the TTM

Despite the model's popularity, research has questioned the effectiveness of interventions based on TTM (Adams & White, 2003; 2005; Bridle et al., 2005; Riemsma et al., 2002; West, 2005) and as a result a number of potential criticisms concerning the development of the model and the validity of its constructs need to be considered. For example, West (2005) has argued that the concept of the 'stage' is flawed in a number of ways and just creates arbitrary lines which hold little useful meaning or explanatory value. This echoes previous criticisms from Bandura (1997) who suggested that TTM is not a genuine theory of change because it does not specify qualitative transformations across stages, an invariant sequence of change and non-reversibility. Bandura (1997) explains that genuine change theories should include these properties in order to provide a valid explanation of change. For example, classifying someone as a contemplator provides no explanation as to why they are considering making changes to their current behaviour.

In reply to these criticisms, Prochaska argues that Bandura makes the mistake of equating stage with theory (Prochaska & Velicer, 1997) and explains that the stages of change were not intended to offer such explanations. Instead, he refers to the processes of change dimension of the model, agreeing with Bandura's (1997) contention that real explanations of change come from examining processes and finding ways to enhance these processes. Despite this, the stages of change remain the dominant and most often applied dimension of the TTM (Richards-reed, Velicer, Prochaska, Rossi & Marcus, 1997). Bunton, Baldwin, Flynn and Whitelaw (2000) attributed this popularity to the simplicity and accessibility that the stages of change provide for practitioners. However, the TTM is multidimensional and therefore cannot be represented by just the stages of change. In a review of health behaviour change interventions based on the TTM, Bridle et al. (2005) explain that the stages of change construct is a variable, not a theory, and question why some researchers seem to assume that a variable can facilitate consistent

intervention effects. As a result Bridle et al. suggested that many interventions based on TTM may be conceptually flawed because they are variable rather than theory driven.

Due to the dominance of the stages of change dimension of TTM, other, arguably more important elements of the model (i.e. processes of change), might be being neglected. However, this should not necessarily be viewed as a criticism of TTM. Instead it reflects poorly on the way the model is being interpreted and subsequently used. As highlighted earlier, the processes of change was the original dimension of TTM and it is within this that the real explanations of change are found (Prochaska & Velicer, 1997). Therefore, the intuitive appeal of the stages of change may ultimately prove to be a limiting factor because researchers and practitioners are placing too much emphasis on this single dimension of the model.

An additional criticism of stage based approaches, concerns the accuracy of methods used to identify an individual's stage of change. Bunton et al. (2000) explain that any predictive value of the model depends on accurate stage recognition and high predictive validity of the supposed staging tool (e.g. stages of change questionnaire). Within PA, a number of tools have been developed and implemented to categorise individuals into one of the five stages of change. However, Adams and White (2005) report that some of these staging methods have not been validated to confirm that they accurately place individuals in the correct stage of activity change (e.g. Calfas et al., 1996; Long et al., 1996). Where evidence has been produced to demonstrate the validity of staging tools within PA (e.g. Cardinal, 1997; Marcus & Simkin, 1993; Wyse, Mercer, Ashford, Buxton & Gleeson, 1995), it is important to recognise that these should not be interpreted as providing support for the validity of the stages themselves (Bunton et al., 2000).

It has also been pointed out that the TTM focuses primarily on individual conscious decision making and as a result neglects some of the broader social and environmental determinants of behaviour change (West, 2005). Within PA, factors such as age, gender and socioeconomic position have been shown to influence exercise behaviour, motivation to participate and stage of change (Booth et al., 1993; Chinn, White, Harland, Drinkwater & Raybould, 1999; Kearney, Graaf, Damkjaer & Engstrom, 1999). Therefore, the TTM seems to discount a number of important behaviour change determinants. As a result, it has been suggested that the model is only relevant to 'behavioural health promotion' aimed at producing and enhancing individual change and is not suited to a population or structural approach (Bunton et al., 2000).

Another criticism of TTM concerns the fact that stage progression is often used as an outcome measure, despite the fact that it is not always associated with behavioural changes. Adams and White (2005), highlight the fact that the ultimate goal of any PA promotion intervention must be to improve activity levels. Consequently, it has been argued that the TTM encourages 'soft' outcomes (West, 2005), which move the focus of the intervention away from changes in PA behaviour. However, it is important to recognise that additional outcome measures of self efficacy and decisional balance were included in the model. Both these constructs have been shown to change in a predictable pattern across the stages of change (Prochaska et al., 1994; Velicer et al., 1998), allowing the more subtle psychological alterations that occur alongside stage progression to be monitored. Therefore, while behavioural changes are the ultimate goal, the TTM recognises that a number of intermediate, non-behavioural, changes do occur.

2.2.4.4 TTM Applications to PA Behaviour Change

The above criticisms highlight numerous potential problems associated with applying the TTM to a PA behaviour change context. However, as explained previously, the TTM is regularly cited as the theoretical framework used to develop and guide PA behaviour change interventions (e.g. Kirk, Mutrie, MacIntyre & Fisher, 2004; Aittasalo, Miilunpalo & Suni, 2004). In order to explore the efficacy of TTM based PA interventions Adams and White (2003) conducted a systematic review, which examined 16 interventions developed and tested between 1982 and 2001. Their results produced evidence to suggest that TTM based PA interventions are reasonably effective in promoting PA adoption but have little influence on long term adherence to increased activity levels. Based on these findings it was concluded that stage based PA promotion interventions may be less effective than originally proposed.

A number of arguments, some of which were mentioned previously, have been presented to explain the lack of support for TTM based interventions. First, it has been suggested that PA behaviour is more complex than single behaviours such as smoking and that individuals could be in a number of different stages of change depending on the type of activity being considered (Adams & White, 2005). Therefore, TTM based interventions that treat PA as a single behaviour, may be failing to recognise the complexity and specificity required for PA interventions. Second, the importance of accurately determining current stage of change was highlighted and it was demonstrated that many of the previously reviewed interventions lacked validated algorithms to assess this (Adams & White, 2005; Bunton et al., 2000). Third, it was suggested that exercise

behaviour may be influenced by a number of factors not considered by the TTM. For example, Adams and White (2005) argue that the TTM focuses on personal motivation for behaviour change and does not take into account external and social factors such as age gender and socioeconomic position. Finally, it has been suggested that many of the previously reviewed interventions may not have been complex enough to do justice to the multidimensional nature of the TTM (Adams & White, 2005). Bridle et al. (2005) explained that many of the studies reported in their review of TTM based health behaviour interventions were tailored only to stage of change and neglected the other dimensions of the model. Therefore, some TTM based interventions may be conceptually flawed because they fail to fully represent the model and are based on a single variable such as the stages of change.

Despite these criticisms, Brug et al. (2005) have suggested that the evidence presented by Adams and White (2005) can be interpreted as supporting TTM-based interventions. For example, they pointed out that the Adams and White (2003) review does provide evidence that such interventions appear to induce short-term behaviour change and short-term changes in motivation and other potential mediators of change. Therefore, the model clearly has some benefit for PA behaviour change. Brug et al. also highlighted that to develop interventions that are based on the TTM, it is crucial to demonstrate a good understanding of the various stage transition determinants or additional dimensions of the TTM. Therefore, some of the TTM-based interventions previously reviewed may fail to demonstrate a complete understanding of all dimensions of the model.

Adams and White (2005) did question whether the PA interventions in their review were complex enough to do justice to the TTM. However, a limitation with their 2003 review is that they failed to examine this by assessing how accurately each intervention was based on the TTM. Another potential limitation with previous reviews concerns the fact that almost all previous criticisms of the TTM seem to be centred on the stages of change dimension of the model. Although this may be accurate, it is also important to consider that previous reviews and critiques may have fallen into the trap of focusing too much on the stages dimension of the model, without considering the pros and cons of its other dimensions. When conducting a systematic review to identify the effectiveness of interventions based on a particular theoretical model, it is crucial to examine how accurately the intervention represents all facets of the theoretical model in question. Bridle et al.'s (2005) review of health behaviour change interventions based on the TTM did suggest that some of the components of the TTM may have been

neglected, resulting in partial rather than full intervention tailoring. However, their review failed to present details regarding how many interventions neglected dimensions of the model and the impact that this might have on their efficacy.

Clearly the TTM represents a popular theoretical framework for PA intervention development. Despite this, a number of criticisms have been directed at it and systematic review evidence questions the efficacy of TTM based approaches. However, these systematic reviews were largely outcome orientated and failed to focus on the quality of the intervention designs and how accurately they reflected all dimensions of the TTM. Therefore, despite there being a wealth of published studies where the TTM is used as a PA intervention framework, we are still unable to draw finite conclusions about the efficacy of these TTM based approaches. Based on this, the following chapter (3) reports on a more comprehensive systematic review of PA behaviour change interventions reported to be based on the TTM, to gain a better understanding of the efficacy of such approaches.

2.4 Chapter Summary

This chapter has critically explored the PA related behaviour change literature from both an applied and theoretical perspective. As a result, considerable scope has been revealed for additional research centring on understanding and encouraging long-term PA behaviour change. Specifically, it has been demonstrated that while a diverse range of intervention strategies have been developed and implemented, the research evidence supporting the efficacy of these approaches remains limited (Hillsdon et al., 2005; Kahn et al., 2002; NICE, 2006). The most significant general limitation of current intervention strategies concerns their ability to bring about long-term sustainable change. Consequently, there is a need for further research into the development of long-term PA behaviour change and relapse prevention interventions strategies.

This chapter also explored a number of theoretical approaches to PA behaviour change, to explore how they are being used to inform interventions designs. This revealed that a range of theoretical accounts have been adopted within exercise psychology. However, none of these commonly adopted theoretical accounts were specifically intended to account for PA related behaviours, instead they originate from motivational, health and social psychology contexts (Marcus and Forsyth, 2003). Consequently, while many of the theoretical constructs, processes and relationships, proposed by these have been observed for PA related behaviours, a number of limitations have also been identified. Most notable of these concerns the theoretical or

explanatory quality of these approaches, when applied to specific phenomena such as long-term PA behaviour change. Specifically, many current theoretical approaches are limited because they only describe generic processes and constructs which can be applied to a wider human behaviour or health related behaviour change context. Consequently, they present information on what needs to be changed to promote healthy behaviour, but not on how changes can be induced (Brug, Oenema & Ferreira, 2005). Therefore, more in-depth theoretical insights into PA behaviour change may need to be achieved, to bring about adequate explanations of change. Alternatively, the observed theoretical diversity within exercise psychology may suggest that our understanding of PA behaviour change is still in its infancy because researchers are forced to borrow from multiple theoretical approaches to build a complete picture of the PA behaviour change process. Therefore, it may be necessary to look beyond what is currently available and attempt to develop a more comprehensive context specific theoretical account of long-term PA behaviour change.

Finally, this chapter has also produced evidence to question the extent to which attempts have been made to apply theory to practice. Specifically, other than for a number of TTM based approaches, very few PA intervention strategies make explicit links to a theory or present evidence of a sound conceptual or theoretical basis (Johnston, Breckon & Hutchison, 2009). This chapter has presented evidence to suggest that often specific elements of theoretical approaches are being incorporated into intervention designs (e.g. informational approaches designed to alter behavioural beliefs), but rarely are attempts made to address all facets of a model or theory in its entirety. This selective "cherry picking" of theoretical constructs and processes arguably undermines the explanatory value of a theory as a whole. Alternatively, where attempts have been made to incorporate theoretical models in their entirety into intervention designs, there is evidence to suggest that many current strategies may be failing to accurately represent the theoretical models in question (Bridle, et al., 2005).

Chapter 3: A Systematic Review of Physical Activity Behaviour Change Interventions Based on the Transtheoretical Model

3.1 Introduction

The purpose of Chapter 2 was to provide an overview of the PA behaviour change related literature, from both an applied and theoretical perspective. The chapter indicated that although a number of different intervention strategies are being implemented, there is limited evidence to support the long term efficacy of these current approaches. It was argued that in order to develop effective interventions, it is first important to understand how people change. Research evidence reveals that the current theoretical understanding of PA behaviour change has been developed using a number of prominent models and theories borrowed from other areas of psychology and psychotherapy. These have generally led to a focus on motives and determinants of PA participation with little emphasis placed on understanding the processes involved in long term change and/or maintenance. However, as explained in Chapter 2, one theoretical approach that does address change as a process and acknowledges maintenance as a stage in this process is the TTM (Prochaska & DiClemente, 1982). Therefore, the purpose of this chapter is to explore the TTM in greater detail based on its suitability for use in the development of PA behaviour change interventions.

3.2 Background

The TTM has been described as an integrative model of behaviour change (Velicer et al., 1998). Although it was refined and tested based on a number of studies which investigated behaviour change within smoking cessation (e.g. DiClemente & Prochaska, 1982; Prochaska & DiClemente, 1983), it has since been applied to a variety of other behaviour change contexts such as HIV prevention (Prochaska, Redding, Harlow, Rossi & Velicer, 1994), substance abuse (Brown, Melchior, Panter, Slaughter & Huba, 2000), diet (e.g. Kasila, Poskiparta, Karhila & Kettunen, 2003) and PA (Kim, Hwang & Yoo, 2004). Within PA, meta-analytical and systematic review based research evidence (Breckon et al, 2008; Marshall & Biddle, 2001; Marcus and Forsyth, 2003) suggest that the TTM is the most commonly cited theoretical framework for developing PA behaviour change interventions and furthering theoretical understandings of the change process in this context. However, despite its popularity, recent research has questioned the effectiveness of interventions based on the TTM (Adams & White, 2003; 2005; Bridle et al., 2005; Riemsma et al., 2002; West, 2005), suggesting that it may not

provide a comprehensive explanation of PA and other forms of health behaviour change. However as explained in Chapter 2, a significant limitation of previous reviews (especially in PA contexts) is that they paid little or no attention to how accurately each intervention represents the TTM.

Therefore, the purpose of this chapter is to critically examine the TTM, based on its suitability for applications to PA behaviour change. Specifically, a systematic review of PA behaviour change interventions reported to be based on the TTM is conducted, to determine how effective they are at encouraging successful PA behaviour change. The review reports on the efficacy of these TTM-based PA interventions and provides insight into how the TTM and all its components are being used to develop such interventions. The results and their implications (for research & practice) are discussed in detail and, based on these and previous research literature (discussed throughout Chapter 2), a rationale is presented for developing a more complete theoretical account of PA behaviour change.

3.3 Method

3.3.1 Sources

The following methods were used to locate relevant published studies. First, electronic searches of computerized databases were carried out (PsycINFO, Science Direct, Web of Science, Scopus, and SPORT Discus). Second, citations in articles identified by the electronic searches were examined. Third, hand searches of the following journals were conducted: *Journal of Sport and Exercise Psychology*, *Journal of Sport Behaviour*, *Health Education Journal*, *Medicine and Science in Sport and Exercise*, *Health Education Research*, and *Research Quarterly in Sport and Exercise*. Keyword combinations for electronic database searches included the following: Transtheoretical model, stages of change model, processes of change, physical activity, exercise, and behaviour change. Figure 3.1 illustrates the study selection process and results of the filtering process. For inclusion, studies were required to meet the following criteria:

1. English language.
2. Published in a peer-reviewed journal.
3. Controlled trials.
4. Publications between 1982 (when the TTM was first described) and January 2007 inclusive.

- 5. Publications involving the development and/or evaluation of interventions explicitly based on the TTM that aim to promote PA behaviour change, as reported in the study methods.
- 6. Some assessment of the effectiveness of the intervention using cognitive, behavioural, or epidemiological outcome measures.

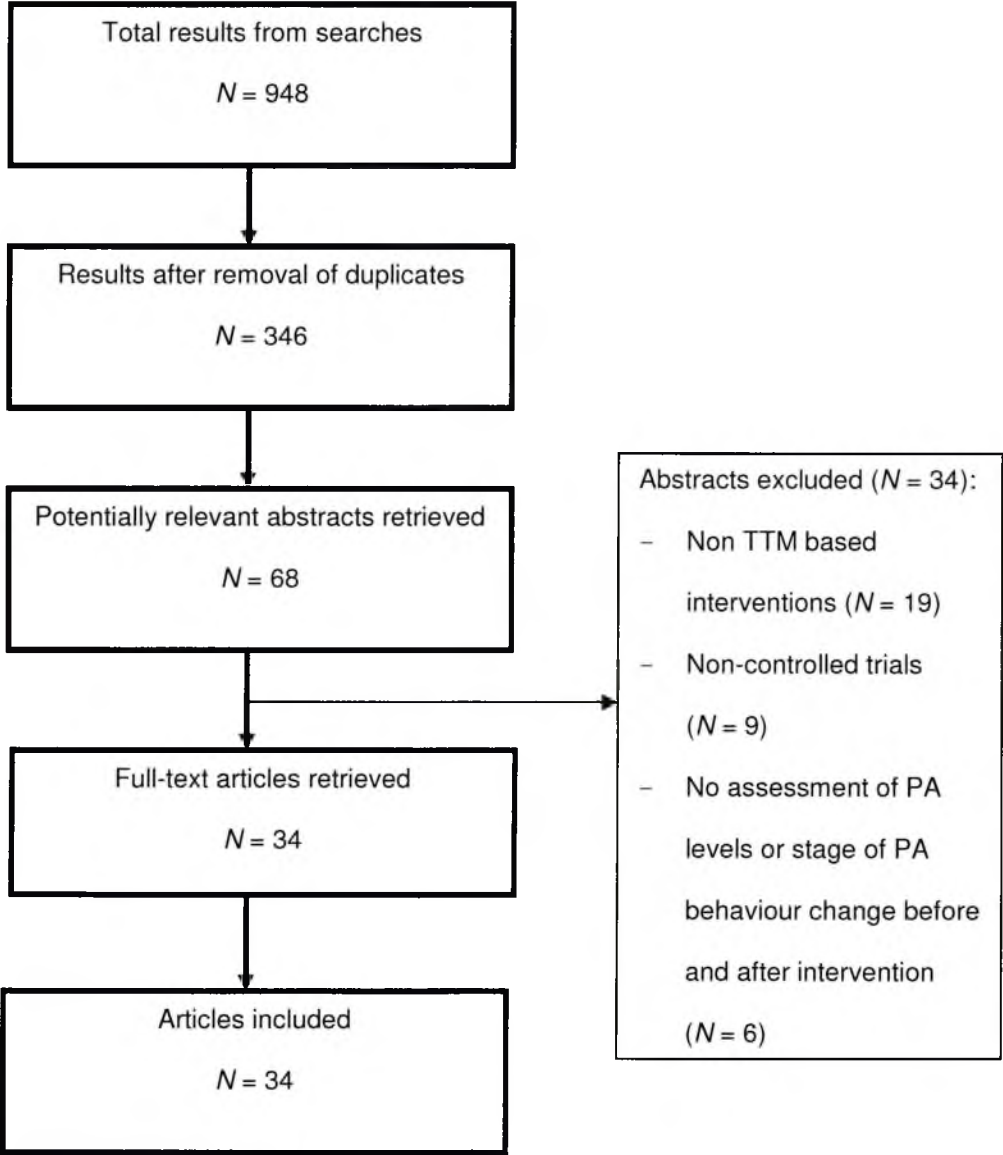


Figure 3.1 Study Selection Process

Cochrane review guidelines encourage the use of rigorous quantitative designs (Higgins & Green, 2006). However, in situations where reviews cover a broad range of comparisons, a more narrative approach is recommended. In the case of this review, there was likely to be some variation in study designs, therefore analysis followed the descriptive, semi-quantitative review protocol outlined in Sallis, Prochaska, and Taylor

(2000). This approach was selected to provide a descriptive yet analytic picture of the reviewed studies.

3.3.2 Procedure

Hard copies of all relevant publications, according to the inclusion criteria, were obtained. Each intervention was coded with a bibliography number (See Table 3.1). Tables 3.2 and 3.3 were then constructed for the selected sample characteristics. Bibliography numbers were used to identify the characteristics that were associated with each intervention. To allow authors the opportunity to clarify how the TTM was used, e-mails were sent to the first author of each study. All e-mails asked the following two questions:

1. If details regarding how the TTM was used to develop the PA interventions were not reported in the paper, were they reported elsewhere, and if so, where?
2. If they were not reported anywhere, could you briefly explain how TTM was applied to your interventions?

Twenty-four e-mails were sent to the first authors of each study. Where multiple papers reported on the same intervention, the first author from one of the studies was contacted initially. If no response was received, then the first author of one of the alternative papers was contacted. Four of the 24 intervention studies did not receive an e-mail as no valid addresses were available for any of the authors. Of the remaining 20, responses were received from nine authors. Where no responses were received, results were restricted to published information only (See Table 3.1 for details of e-mail responses).

Table 3.1 Bibliography Details, Intervention Names and Corresponding Publications

Bibliography Number	Name of Intervention/Project	Related Publications	Journal
1	Cardinal & Sachs ^b	Cardinal & Sachs (1996)	<i>J Sport Med Phys Fit</i>
2	Change of Heart ^a	Hilton et al. (1999) Steptoe et al. (1999) Steptoe et al. (2001)	<i>Health Educ J</i> <i>BMJ</i> <i>Am J Public Health</i>
3	Dallow & Anderson ^a	Dallow & Anderson (2003)	<i>Am J Health Promot</i>
4	Fresh Start	Graham-Clarke & Oldenburgh (1994)	<i>Behaviour Change</i>
5	Hassler et al.	Hassler et al. (2000)	<i>Pract Diabetes Int</i>
6	Jump Start to Health ^a	Marcus et al. (1998)	<i>Am J Health Promot</i>
7	Kim et al. ^a	Kim et al. (2004)	<i>Int J Nurs Stud</i>
8	Kirk et al. ^b	Kirk et al. (2001)	<i>Diabetic Med</i>
9	Kirk et al. ^b	Kirk et al. (2004)	<i>Am J Prev Med</i>
10	Loughlan & Mutrie ^a	Loughlan & Mutrie (1997)	<i>Health Educ J</i>
11	Marcus et al. and Bock et al. ^a	Marcus et al. (1998) Bock et al. (2001)	<i>Ann Behav Med</i> <i>Ann Behav Med</i>
12	Marshall et al. ^b	Marshall et al. (2003)	<i>Ann Behav Med</i>
13	Marshall et al. ^b	Marshall et al. (2004)	<i>Am J Health Promot</i>
14	Moms on the Move ^b	Fahenwald et al. (2004)	<i>Ann Behav Med</i>
15	Naylor et al.	Naylor et al. (1999)	<i>Health Educ Res</i>
16	Peterson & Aldana ^a	Peterson & Aldana (1999)	<i>Am J Health Promot</i>
17	Physically Active for Life ^b	Pinto et al. (1998) Goldstein et al. (1999) Pinto et al. (2001)	<i>Am J Prev Med</i> <i>Ann Behav Med</i> <i>Ann Behav Med</i>
18	Pinto et al. ^b	Pinto et al. (2005)	<i>J Clin Oncol</i>
19	Project Active ^a	Dunn et al. (1997) Kohl et al. (1998) Dunn et al. (1999) Sevick et al. (2000)	<i>Prev Med</i> <i>Med Sci Sport Exer</i> <i>JAMA</i> <i>Am J Prev Med</i>
20	Project PACE-1 ^a	Calfas et al. (1996) Long et al. (1996) Calfas et al. (1997)	<i>Prev Med</i> <i>Am J Prev Med</i> <i>Prev Med</i>
21	Project PACE-2 ^a	Norris et al. (2000)	<i>Prev Med</i>
22	Telephone-Linked Communication Physical Activity Counseling ^b	Pinto et al. (2002)	<i>Am J Prev Med</i>
23	The Newcastle Exercise Project	Harland et al. (1999)	<i>BMJ</i>
24	Woods et al. _a	Woods et al. (2002)	<i>Health Educ Res</i>

a. Indicates that an email was sent out to allow authors to clarify their use of TTM but no response was received.

b. Indicates that an email was sent out to allow authors to clarify their use of TTM and a response was received.

3.4 Results

Table 3.2 summarizes the general study characteristics, and Table 3.3 summarizes which dimensions of the TTM were used to develop each intervention. A narrative summary is also included to elaborate on the development of each intervention.

3.4.1 Sample Characteristics

The review identified 34 relevant articles, which reported on the efficacy of 24 different TTM-based PA behaviour change interventions. Twenty-one randomized controlled trials (88%) and 3 nonrandomized controlled trials (22%) were conducted from 1996 to 2005. The dominant techniques used in the interventions were the distribution of TTM-based written information on PA (66%) and PA counselling based on the TTM (71%). Additional intervention techniques included computer-generated PA feedback (8.3%) and telephone advice (12.5%). The most common control conditions were routine care by physicians (33%) and delivery of non-TTM-based written material (25%). Twenty-nine percent of the reviewed interventions were categorized as brief intensity, 38% were categorized as medium intensity, and 29% were categorized as intensive (see Table 3.2 for a description of each intensity).

In the short term (6 months or less), 18 of the 24 studies (75%) reported a significant effect for TTM-based interventions over control conditions in terms of stage progression, activity levels, or both. Long-term results (over 6 months) were obtained in 8 out of the 24 interventions (33%), and only 2 conducted follow-up assessments past 12 months (8%). Of the 8 studies that conducted long-term follow-up assessments, 2 (25%) reported a significant effect for TTM-based interventions over control conditions. Sample characteristics are reported in Table 3.2.

Table 3.2 Study Design and Sample Characteristics

Characteristic	Biblio. No.	No. of Studies (%)
Sample Size		
< 50	5, 7, 8	3 (12.5)
50-99	3, 9, 14, 18	4 (16.7)
100-249	1, 10, 11, 19	4 (16.7)
250-499	12, 15, 17, 20, 22, 24	6 (25)
500-749	13, 23	2 (8.3)
750-1000	2, 4, 16, 21	4 (16.7)
> 1000	6	1 (4.2)
Percentage of Sample Completing		
Intervention		
< 50%	24	1 (4.2)
50 – 60%	2, 4, 6	3 (12.5)
60 – 70%	5, 15, 16	3 (12.5)
70 – 80%	1, 3, 11, 12	4 (16.7)
80 – 90%	8, 9, 13, 14, 19, 20, 22, 23	8 (33.3)
90 – 100%	7, 17, 18, 21	4 (16.7)
Unknown	10	1 (4.2)
Country		
USA	1, 3, 5, 6, 11, 14, 16, 17, 18, 19, 20, 21, 22	13 (54.2)
UK	2, 8, 9, 10, 15, 23, 24	7 (29.2)
Australia	4, 12, 13	3 (12.5)
South Korea	7	1 (4.2)
Design		
Randomised by individual, controlled	3, 5, 6, 8, 9, 10, 11, 14, 16, 18, 19, 22, 23, 24	14 (58.3)
Randomised by intervention provider, controlled	2, 4, 17, 21	4 (16.7)
Stratified randomised, controlled	1, 12, 13	3 (12.5)
Non-randomised, controlled	7, 15, 20	3 (12.5)
Nature of TTM Based Intervention		
Written material	1, 4, 6, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 24	16 (66.7)
One on One Counselling	2, 5, 7, 8, 9, 10, 14, 15, 17, 20, 21, 23	12 (50)
Video Counselling	4	1 (4.2)
Group Counselling/Instruction	3, 19	2 (8.3)
Telephone Counselling	7, 18, 22	3 (12.5)
Computer Generated Feedback	11, 22	2 (8.3)
Follow up phone calls	2, 9, 14, 20, 21	5 (20.8)

Characteristic	Biblio. No.	No. of Studies (%)
Intensity of Intervention^a		
Brief	1, 5, 8, 10, 12, 13, 16	7 (29.2)
Medium	2, 6, 7, 14, 15, 18, 20, 23, 24	9 (37.5)
Intensive	3, 9, 11, 17, 19, 21, 22	7 (29.2)
Unknown	4	1 (4.2)
Control Condition		
Routine Care	2, 4, 7, 15, 17, 20, 21, 23	8 (33.3)
Non-TTM based written material	5, 6, 8, 9, 10, 11	6 (25)
Supervised PA or personalised PA prescription	3, 19	2 (8.3)
Fitness assessment	1, 10	2 (8.3)
Telephone advice or assessment	9, 18	2 (8.3)
Non PA related counselling	14, 22	2 (8.3)
No intervention	12, 13, 16, 24	4 (16.7)
Follow Up		
0 to 1 month	1, 5, 10, 11, 14	5 (20.8)
1 to 3 months	6, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 20, 22, 23	14 (58.3)
3 to 6 months	2, 3, 4, 7, 10, 11, 12, 15, 19, 21, 22	11 (45.8)
6 to 12 months	2, 3, 11, 13, 17, 23	6 (25)
> 12 months	4, 19	2 (8.3)
Not Specified	24	1 (4.2)
Significantly Effective^b		
Short Term	2, 3, 5, 6, 7, 8, 9, 11, 12, 14, 16, 17, 18, 20, 21, 22, 23, 24	18 (75%)
Long Term	2, 11	2 (8.3%)

a. For the purposes of this table each PA intervention has been categorised as brief, medium or intensive based on the duration and intensity of the described protocol. Interventions have been labelled brief if they involved a single delivery of intervention material such as a single mailing of written information or a one-off counselling session. Medium interventions refer to ones that were specifically designed to last for between 1 and 3 months and involved more than one delivery of intervention material. Intensive interventions refer to PA interventions that were designed to last more than 3 months and involved multiple contact with the interventionists, or more than one delivery of intervention material.

b. Effective refers to the superiority of TTM based interventions compared with the controls in terms of progression through the stages of change or an increase in activity related variables using a significance level of $p < 0.05$. Short term effectiveness represents studies that revealed a significant effect over 6 months or less; long term effectiveness represents studies that revealed a significant effect over more than 6 months. For each individual characteristic, studies that revealed at least short term significant findings in favour of intervention group are marked in italics.

3.4.2 Intervention Development

Table 3.3 reports on which dimensions of the TTM were used to develop each intervention. Overall, only 7 of the 24 (29%) interventions referred to all 4 dimensions of the TTM when describing their development procedures. All 24 interventions used the stages-of-change dimension to develop the intervention protocol. The processes of change were used for the development of 17 of the interventions (71%). The decisional balance dimension was used for the development of 15 of the interventions (63%). Finally, the self efficacy/temptation dimension was used for the development of only 8 of the interventions (33%). In some of the instances where decisional balance and self-efficacy/temptation were used for intervention development, they were not actually identified as dimensions of the TTM and were referred to as separate independent variables (See Table 3.3).

Of the 7 interventions that were developed using all four dimensions of the TTM, 6 reported statistically significant short-term findings, and 1 intervention revealed significant short- and long-term findings. Of the 17 interventions that were not tailored to all four dimensions of the TTM, 12 (71%) reported significant short-term findings, and 1 reported significant short- and long-term findings. In addition to the TTM, other theoretical models did influence the development of several of the interventions. The most commonly applied was the social cognitive theory, in 5 of the 24 studies (21%). In addition to this, health education theory, self-efficacy theory, and decision-making theory were also cited as separate contributing theories and not simply variables within TTM (in the cases of self-efficacy theory and decision-making theory).

Table 3.3 Summary of TTM Dimensions Included in PA Intervention Development

Characteristic	Bibliography Number	No. of Studies (%)
TTM Dimensions		
Stages of Change	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, <i>11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24</i>	24 (100)
Processes of Change	1, 3, 4, 6, 7, 9, <i>11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 24</i>	17 (70.8)
Decisional Balance	1 ^a , 5 ^a , 6, 7, 8 ^a , 9 ^a , 10 ^a , <i>11, 14, 17^a, 18^a, 19, 20^a, 21^a, 22^a</i>	15 (62.5)
Self Efficacy	7, <i>11, 14, 17^a, 19^a, 20^a, 21^a, 22^a</i>	8 (33.3)
Number of TTM Dimensions		
Included		
1	2, 23	2 (8.3)
2	3, 4, 5, 8, 10, <i>12, 13, 15, 16, 18, 24</i>	11 (45.8)
3	1, 6, 9, 20	4 (16.7)
4	7, <i>11, 14, 17, 19, 21, 22</i>	7 (29.2)
Additional Theoretical Frameworks		
Social Cognitive Theory	1, <i>17, 19, 20, 22</i>	5 (20.8)
Health Education Theory	<i>17</i>	1 (4.2)
Decision Making Theory	22	1 (4.2)
Self-Efficacy Theory	3	1 (4.2)

NOTE: As for Table 3.2, studies that revealed at least short-term significant findings in favour of the intervention group are marked in italics.

a. Indicates that the variable was mentioned in the methods, but it was not identified as a dimension of the TTM and was referred to as a separate independent variable.

3.4.3 Narrative Summary of TTM-Based Intervention Development

The following narrative summary presents additional descriptive information regarding how the reviewed studies have applied TTM to develop their PA behaviour change interventions. In a number of the sample projects, it was reported that interventions were developed using literature that describes how the processes of change relate to the stages of change (e.g., Dallow & Anderson, 2003; Graham-Clarke & Oldenburgh, 1994; Marshall et al., 2003). In these instances, it was reported that the strategies or counselling messages would focus on a particular stage of change and contain activities or information consistent with the related processes of change. Descriptive accounts revealed that some of these interventions were developed with reference to Prochaska and DiClemente's (1983) original findings concerning the

relationship between the stages and process of change (e.g., Marcus et al., 1998a; Marshall et al., 2003, 2004), and others referred specifically to Marcus et al's (1992) findings based on exercise adoption (e.g., Cardinal & Sachs, 1996; Naylor, Simmonds, Riddoch, Velleman, & Turton, 1999).

As illustrated in Table 3.3, some interventions did refer to additional dimensions of TTM as well as the stages and processes of change (e.g., Bock, Marcus, Pinto, & Forsyth, 2001; Fahrenwald, Atwood, Walker, Johnson, & Berg, 2004; Kim et al., 2004; Marcus et al., 1998b). In these instances, an assessment of self-efficacy and/or decisional balance toward increased PA was conducted as well as an assessment of readiness or stage of change. Strategies or counselling messages were then developed, first to be consistent with the related processes of change, but also to encourage an increase in self-efficacy and/or to positively influence decisional balance. Therefore, where decisional balance and/or self-efficacy were taken into account, interventions included additional elements designed to address these dimensions.

Finally, a small number of the projects referenced either Loughlan and Mutrie's (1995) guidelines for conducting exercise consultations (Hassler, Fisher, MacIntyre, & Mutrie, 2000; Kirk et al., 2001; Loughlan & Mutrie, 1997) or Miller and Rollnick's (2002) client-centred counselling style, MI (Harland et al., 1999), to explain the techniques used to implement their TTM-based PA interventions.

3.5 Discussion

The aims of this review were to critically examine how the TTM is being applied to develop PA behaviour change interventions and to determine whether these TTM-based interventions are effective in promoting PA behaviour change. Regarding these aims, results revealed that only seven of the interventions (29%) were developed using all four dimensions of the TTM. Of those interventions, six reported statistically significant short-term findings, and only one intervention revealed significant short and long-term findings in favour of the intervention groups. Therefore, very few studies have reported to have applied all facets of the model and subsequently have not acknowledged its multidimensional nature. As a result, a potentially significant limitation with this study concerns the fact that the efficacy of TTM-based approaches cannot be accurately determined because only seven of the reviewed interventions were accurately based on the model. However, by providing a detailed overview of both how the reviewed interventions were developed and their efficacy, this review is able to highlight important implications regarding the development of future PA interventions.

3.5.1 Theoretical Implications

Consistent with Bridle et al.'s (2005) findings, the stages of change were the dominant dimension of the model and were cited in the development of all the reviewed interventions. When describing the TTM, Velicer et al. (1998) explained that the stages of change are just one of four key dimensions of the model. Despite this, the TTM is often referred to as the "stages of change model" (e.g., Adams & White, 2005; Bunton et al., 2000) irrespective of the fact that the processes of change were the original dimension. Bridle et al. (2005) explained that the stages of change construct is a variable, not a theory, and stated that it is unclear why researchers would assume that a variable could facilitate consistent intervention effects. In other words, the stages of change are just an organizational construct, which on their own provide no explanation of behaviour change. It is only when they are combined with the other dimensions of the TTM that any explanatory power can be assumed. As a result, Bridle et al. suggested that many TTM-based interventions may be flawed because they are variable (i.e., the stages of change) rather than theory (TTM) driven. Therefore, although interventions that are developed using single constructs from the model (e.g., stages of change) do demonstrate a degree of theoretical underpinning, they should not be described as TTM based.

Given that 71% of the reviewed interventions were developed with reference to both the stages and processes of change dimensions of TTM, it is clear that a large number of studies did recognize the TTM to be more than just the stages of change. However, when acknowledging the multidimensional nature of TTM, it is important to demonstrate a good understanding of how the various dimensions relate to one another and recognize how these relationships will influence intervention development. It is generally recognized that the relationship between the stages and processes of change differs depending on the behaviour change context that they are applied to (Velicer et al., 1998). Originally, the TTM was refined and tested based on a number of studies that investigated behaviour change within smoking cessation (e.g., Prochaska & DiClemente, 1983). However, for PA behaviour change, Marcus et al. (1992) found that the use of behavioural processes does not decline as individuals progress from action through to maintenance (as for smoking cessation), and the use of experiential processes peaks in the action stage for PA adoption compared to the preparation stage for smoking cessation. Results of this review revealed that some interventions are being developed with reference to the findings observed within smoking cessation, and others were developed based on Marcus et al.'s (1992) PA-based findings. Therefore, although all

these interventions claim to be developed to encourage PA behaviour change, some of them have clearly failed to recognize the previously observed differences between PA behaviour change and smoking cessation with regard to stage and process interactions. As a result, TTM-based PA behaviour change interventions may vary based on how they address these interactions.

Based on the findings of this review, it is not possible to draw accurate conclusions regarding the efficacy of TTM-based interventions, due to the fact that few of the reviewed studies incorporated all dimensions of the TTM into their intervention designs. However, the results do provide some exploration of this by revealing whether interventions that fail to accurately represent the TTM are any less effective. Specifically, 17 (71%) of the interventions were not tailored to all four dimensions of the TTM, and of those, 12 (71%) reported significant short-term results in favour of the intervention group. One intervention (The Change of Heart: Hilton et al., 1999; Steptoe et al., 1999; Steptoe, Kerry, Rink, & Hilton, 2001), which was tailored to only one dimension of the TTM (the stages of change), was shown to be effective in both the short term and long term. By comparing these figures to the efficacy findings for the interventions developed using all four dimensions of the TTM, it can be observed that both sets of interventions revealed similar findings (i.e., short-term effectiveness was reasonably common, but long-term effectiveness was very rare). Therefore, the extent to which interventions are accurately based on the TTM may not influence their efficacy.

A possible explanation for this is that not all four elements of the TTM are required for effective interventions. However, the results tables demonstrate that no dimension or combination of dimensions consistently led to significantly effective interventions. One potentially notable observation concerns the fact that of the studies that reported no significant findings, only one included the self-efficacy construct in its design. However, this dimension was only included in 8 of the 24 intervention designs in the first place. Therefore, to comment on the relative influence of individual dimensions of the TTM, such as self-efficacy, future interventions need to accurately reflect all dimensions of the model.

Alternatively, the results of this review may suggest that the TTM does not provide an accurate enough explanation of PA behaviour change, and as a result, the effectiveness of the reviewed interventions was determined by a number of other factors relating to their design and delivery. To explore the role of one such factor and provide a comprehensive picture of intervention integrity, the reviewed interventions were categorized into brief, medium, or intensive (See Table 3.2 for definitions of different

intensities). Results revealed that TTM-based PA behaviour change interventions vary in their intensity from very brief interventions, involving only one delivery of intervention material, to intensive interventions that last for up to 6 months and involve multiple modes of delivery. Table 3.2 illustrates that intensive and medium-intensity interventions were effective in the short term in 86% and 89% of studies, respectively, compared with 57% of brief intervention studies. Of the two interventions that reported significant long-term findings, one was categorized as medium intensity and the other intensive. Therefore, consistent with findings presented by Marcus et al. (2006), the intensity of PA interventions may well influence their effectiveness.

One notable limitation with this review concerns the fact that although e-mails were sent out to allow authors the opportunity to clarify how the TTM was used to develop their interventions, only nine replies were received. Therefore, it could be argued that the findings of this review are based on incomplete information. By contacting authors in this way, this review attempted to go beyond normal systematic review methods to obtain greater detail and ultimately present more accurate findings based on what is available in the public domain. However, the review would have been strengthened if more responses had been received.

3.5.2 Implications for Research

To draw conclusions about the efficacy of TTM-based interventions, true tests of the comprehensive model (i.e., all dimensions) are required. In addition to this, future research may also consider conducting tests of the individual dimensions to determine how essential they are to the model. To facilitate this, future studies may consider applying treatment fidelity measures to encourage researchers to accurately develop and fully describe the exact nature of their interventions. There has already been a call for the application of treatment fidelity measures within PA behaviour change for counselling based interventions (See Breckon et al., 2008). Resnick et al. (2005) explained that treatment fidelity provides a systematic process for the design and implementation of interventions and should ensure consistent and reliable results. Treatment fidelity measures are methodological procedures, which can be used to ensure that appropriate theoretical models are applied accurately and that those delivering the interventions are competent at applying the theoretical concepts appropriately. For more information on treatment fidelity measures, see Resnick et al. (2005).

Although the efficacy of TTM-based interventions has still not been determined unequivocally, there appears to be further valid criticisms of the TTM that could be explored in future research. For example, no attempts have been made to ascertain whether other processes may exist within PA behaviour change beyond those specified by the TTM. The processes of change were originally identified on the basis of a comparative analysis of the major systems of psychotherapy (Prochaska, 1979). This comparative analysis identified any reoccurring processes of change across the various psychotherapy systems (J. C. Norcross, personal communication, September 19, 2006). Therefore, the processes of change highlighted by the TTM are those that are most commonly referenced by a number of psychotherapy and/or behaviour change models. Consequently, the processes of change are global in nature, and as a result, they are likely to fit with a wide range of behaviour change settings including PA. Based on this observation, a potential weakness with the model concerns the fact that any context specific processes only identified by a small number of therapy systems will not have been included in the TTM. Therefore, while the processes identified by the TTM have been shown to be present in PA behaviour change (Marcus et al., 1992; Marshall & Biddle, 2001), there may be a number of additional processes specific to PA behaviour change that the TTM does not account for.

An alternative, more fundamental criticism of the TTM's development was highlighted by Bandura (1997), who suggested that it may be inappropriate to integrate and compare divergent theories. Bandura suggested that many of the therapy systems analysed by Prochaska (1979) have incompatible understandings of causality and motivation, and profoundly different prescriptions for intervention. For example, both client centred therapy (Rogers, 1951) and cognitive behavioural therapy were included in Prochaska's (1979) comparative analysis. Client centred therapy states explicitly that the necessary conditions for therapy are contained within the therapeutic relationship and that the therapist should be congruent, integrated and genuine (Rogers, 1957). However, Prochaska (1979) explains that for cognitive behavioural approaches, the therapist would do clients an injustice by applying Rogers' criteria because social reinforcements are in reality contingent. Therefore, while combining a number of conflicting systems may have helped simplify the field of psychotherapy, it could also be viewed as contradictory to integrate a range of divergent and often opposing philosophical, theoretical and therapeutic positions.

Ultimately, to gain a more complete understanding of PA behaviour change, it may be necessary for researchers to look beyond broad, readily available theoretical

frameworks such as the TTM and consider developing more context-specific models. This may necessitate a shift to qualitative forms of enquiry to encourage open-ended, exploratory approaches to understanding behaviour change related constructs and processes that are specific to PA. Bunton et al. (2000) suggest that this may lead to behavioural processes becoming more complex and less predictable, making intervention strategies more complicated. However, the applied value of any process related information is likely to be far greater if it is context specific because interventions can be based on more relevant and accurate explanations of human behaviour change.

By re-tracing the development of TTM, the validity of the stages of change construct for PA behaviour change can also be called into question. The stages of change dimension of TTM came about because early research in this field (Prochaska & DiClemente, 1983; DiClemente & Prochaska, 1982) found it necessary to ask when changes occur, in order to explain the relative contributions of the client and intervention variables and also to understand the underlying structure of behaviour change (Prochaska, DiClemente & Norcross, 1992). Specifically, the stages of change were identified during an empirical investigation of the processes that individuals use to change their troubled behaviour (DiClemente & Prochaska, 1982). In a retrospective study of smokers who successfully stopped smoking on their own compared with smokers participating in two separate treatment programmes, it became apparent that each group tended to progress through a sequence of stages of change. Therefore, by applying the TTM to PA behaviour change, researchers and practitioners are assuming that individuals progress through the same stages as observed with smokers. While this may not seem unreasonable, there are fundamental differences between smoking cessation and PA behaviour change that should be considered. For example, smoking cessation is concerned with giving up a negative behaviour, which among other aspects, involves overcoming a physiological addiction (Emmons, 1999). Whereas PA behaviour change is about the uptake of positive health behaviours; a process which appears to be influenced by a variety of psychological, social, environmental and biological factors (Biddle & Mutrie, 2008). For smoking cessation, when the physiological symptoms associated with addiction decline (i.e. cravings), it seems reasonable to suggest that less effort is required to make the necessary behavioural changes. However, for PA behaviour change the effort involved to make the necessary behavioural modifications may be more enduring. As a result the transition between the action and maintenance stages for PA behaviour change is less definable and it is

potentially more difficult to classify someone as being in maintenance. Bandura has maintained that "human functioning is simply too multifaceted and multi-determined to be categorised into a few discrete stages" (Bandura, 1997, p.9). Therefore, the stages of change may be better represented by descriptive information about a person's actions and cognitions which explain their 'state' of change.

3.5.3 Implications for Practice

Until more is known about the efficacy of TTM-based approaches, it is crucial for those developing and delivering PA interventions to recognize the potential complexities of PA behaviour change and consider the wide range of variables that may be involved. Any behaviour change intervention should assist clients in resolving their ambivalence and reluctance to change by addressing the cognitive, behavioural, and environmental factors involved (Rollnick, Miller, & Butler, 2008). Although there may not be an established theoretical framework available to describe the individual processes and determinants of PA behaviour change, there are specific techniques designed to assist with the process mentioned above. For example, the person-centred counselling approach of MI (Rollnick et al., 2008), commonly used in the addiction setting as a tool for eliciting successful behaviour change, is receiving increasing research support in the PA and exercise setting (e.g. Bennett, Lyons, Winters-Stone, Nail & Scherer, 2007; Brodie & Inoue, 2005). Alternatively, the Five A's framework, adapted from tobacco cessation interventions (Fiore et al., 2000), has been shown to provide a workable framework for the development of behaviour change interventions in a number of settings including PA (Whitlock, Orleans, Pender, & Allan, 2002).

3.6 Chapter Summary

In conclusion, although the TTM continues to provide a popular framework for the development of PA interventions, the results of this review highlight numerous inconsistencies in the development and implementation of TTM-based PA interventions. In order to draw more concrete conclusions about the efficacy of TTM-based approaches, those attempting to develop such interventions need to demonstrate a comprehensive understanding of all dimensions of the model and how they relate to one another. It is then crucial that they fully articulate how they have applied this information to develop their interventions.

Despite these limitations, this chapter raises a number of other potentially valid criticisms associated with applying the TTM to understand PA behaviour change. In

particular, evidence has been highlighted to support the argument that the TTM does not provide an accurate enough framework for understanding the process of PA behaviour change. Specifically, TTM is grounded in systems of psychotherapy and at best represents a general summary of the most commonly observed change processes across these systems. It was also refined and tested based on research within smoking cessation, which it has been argued, possesses a number of fundamental differences to PA behaviour change. Therefore, based on the evidence presented in this chapter and in Chapter 2, it appears that despite adopting a number of theoretical approaches, the current understanding of how people adopt PA and then go on to maintain those changes, remains limited. Previous research that has adopted pre-existing models has undoubtedly produced a wealth of knowledge surrounding PA determinants, motives and even cognitive and behavioural processes associated with PA participation. However as of yet, there is no tried and tested comprehensive account of the PA behaviour change process. Consequently, researchers seeking to develop interventions designed to encourage long-term PA participation are forced to rely on a diverse range of empirical and theoretical information. Based on this, the remainder of this thesis focuses on developing a more comprehensive theoretical account of successful PA behaviour change.

Chapter 4: Epistemology, Theoretical Perspective and Methodology

4.1 Introduction

In order to develop a theoretical account of successful PA behaviour change, a number of research approaches were originally considered. However, as explained in Chapter 1 (Section 1.2), ultimately, a decision was made to adopt GTM. To understand what informed this decision, it is necessary to discuss the philosophical underpinnings of this thesis and describe my own² theoretical perspective, and its underlying epistemological stance. When developing a research proposal, Crotty (1998) identifies four specific questions that need to be addressed, which ultimately inform one another (See Figure 4.1).

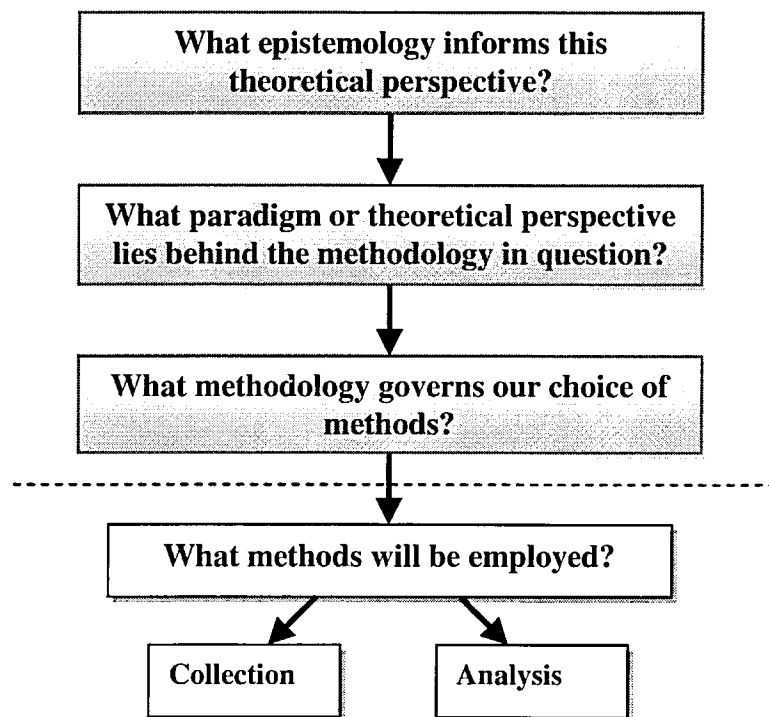


Figure 4.1 Four Questions to Address when Developing a Research Proposal (adapted from Crotty, 1998, pp. 2-4).

The purpose of this chapter is to address the first three of Crotty's questions by describing the epistemological assumptions, theoretical perspectives and methodological debates that were considered during the design of the current study. By adopting a philosophical stance Benton and Craib (2001) argue that prejudices, superstitions and unquestioned assumptions, which often act as obstacles to scientific

² The first-person pronoun is used at times to refer directly to the 1st author of this thesis where appropriate.

progress, can be exposed and criticised. By presenting the philosophical foundations of a research endeavour, the researcher is also actively presenting a claim to scientific status (Potter, 2000). Therefore, in describing the philosophical underpinnings, this chapter provides readers with an in-depth justification for the chosen methodological approach (GTM). It also allows readers to assess the quality of the research in terms of its credibility, authenticity and overall contribution to knowledge. To present this information in a logical manner, this chapter adopts Crotty's (1998) framework of the research process (See Figure 4.1) to guide the reader through the relevant decisions that resulted in the chosen methodology.

4.2 Epistemology

An epistemology is a way of understanding and explaining how we know what we know. Epistemologies represent theories of what knowledge is, which ask and attempt to answer questions such as: What are the sources of knowledge? Or what does it mean to say that we know something? (Potter, 2000). Bryant and Charmaz (2007) explain that all research methods make epistemological claims, which indicate why their applications lead to the development of knowledge. Therefore, it is these epistemological claims that form the basis for choosing a particular research approach. As explained above, the researcher's epistemological viewpoint ultimately informs their philosophical stance, which in turn informs their chosen methodology. Therefore, a researcher's theoretical perspective outlines the assumptions buried within their chosen methodology (Crotty, 1998), providing insight into the logic behind the chosen research approach. This section of the chapter describes some of the dominant epistemological viewpoints and their associated theoretical perspectives with reference to how they relate to different research approaches. This includes examples of how the thesis might have progressed from alternative epistemological underpinnings, in contrast to the chosen constructivist approach to GTM, which is described towards the end of this chapter.

When reviewing various literature sources on the philosophical foundations of different research approaches, it became apparent that the terminology used is far from consistent. Specifically, some literature sources differentiate between the terms *perspective* and *paradigm* (e.g. Denzin & Lincoln, 2005; 2008). Paradigms have been described as “a basic set of beliefs that guide action” (Guba, 1990, p.17). Consequently, they refer to the basic principles that we construct based on our epistemological assumptions. However Denzin and Lincoln (2008) suggest that perspectives are less

solidified or as well unified as paradigms. Therefore paradigms appear to be viewed as being more fundamental than perspectives. Despite this, paradigms and perspectives appear to share many commonalities with one another as both are ultimately a product of an underlying epistemology. To reflect this, the term paradigm has been incorporated into Figure 4.1 to demonstrate how it may fit with Crotty's (1998) framework for the foundations of social research.

4.2.1 Objectivism

Within exercise science, epistemological debates are often ignored because a common, dominant stance is assumed. This same stance is often also reflected in descriptions of the scientific method found in the opening chapters of most introductory textbooks for virtually all of the sciences (Potter, 2000). From this perspective, science is viewed as an objective systematic process through which hypotheses are formulated and then tested (e.g. Thomas, Nelson & Silverman, 2005; Hyllegard, Mood & Morrow, 1996). This type of approach is representative of an objectivist epistemological perspective. Objectivism, is the epistemological view that things exist as meaningful entities independently of consciousness and experience, that they have truth and meaning residing in them as objects, and that careful research can attain that objective truth and meaning (Crotty, 1998). The traditional paradigm or theoretical perspective that derives from an objective epistemology is positivism.

4.2.1.1 Positivism and Postpositivism

Positivism refers to an objective approach whereby scientific knowledge is grounded firmly and exclusively in something that is posited or factual (Crotty, 1998). Positivists assume that there is an objective reality that is absolutely true, and with appropriate methods we can come to know that reality (Vealey, 2006). In order to eliminate speculation, positivistic research usually involves carefully controlled studies which are often laboratory based. Despite its popularity, early dissatisfaction with this dominant stance in sport and exercise psychology was voiced by Martens (1979, 1987), on the grounds that controlled studies in laboratory environments lacked external validity because they neglect the influence of the natural environment. Although Martens' criticisms did not stimulate a move away from the objectivist stance, a shift from positivism to postpositivistic practices in sport and exercise psychology has been observed (Vealey, 2006).

While positivism contends that there is a reality out there to be studied, captured and understood, postpositivism argues that "reality can never be fully apprehended, only approximated by the individuals involved" (Guba, 1990, p.22). Therefore, postpositivism accounts for the methodological impossibility of controlling all necessary variables in all research situations. Despite this, objectivity remains the ideal from a postpositivist position. Postpositivists strive for objectivity by acknowledging their biases, paying attention to the intellectual traditions of the field and attending to the observations and judgements of key players through peer feedback (Morris, 2006). Therefore, they reject the positivistic notion that any individual can see the world perfectly as it really is and consequently view objectivity as something that we (the research community) strive for but will never achieve perfectly.

While a postpositivistic position may allow for a more pragmatic exploratory approach to understanding objective reality, there is little evidence to suggest that this has been achieved within sport and exercise psychology generally and PA behaviour change related research specifically. For example, in the late 70's and early 80's key theories from psychology began to inform new research lines in sport and exercise psychology (Vealey, 2006). This appeared to reflect an observed shift towards acknowledging the early dissatisfaction with the dominant positivistic stance (Martens, 1979, 1987). By incorporating previously developed psychological constructs, researchers were able to actively recognise other intellectual positions within the field, while still maintaining an objective stance by examining pre-defined hypotheses using measurable, testable constructs. Consequently, within exercise psychology this type of research is still actively embraced (e.g. Chatzisarantis et al., 2003; Hagger, et al., 2002; McAuley & Blissmer, 2000).

There are however, limitations associated with these postpositivistic approaches. For example, the current thesis could have adopted a similar approach by using existing psychological measures, such as the Processes of Change Questionnaire (Marcus et al., 1992), to monitor previously identified processes of change experienced by individuals going through PA behaviour change. However as explained in Chapters 2 and 3, by applying a readily available framework, the researcher is limited to looking at processes already identified by TTM, which is potentially problematic due the number of criticisms that have been directed at TTM (See Chapters 2 & 3). Landers (1983) also argued that this type of approach can facilitate premature commitment to these pre-existing theoretical approaches. Therefore, in order to account for other processes that might be occurring in PA behaviour change, more ecologically valid research

approaches need to be considered, which may be underpinned by alternative epistemological positions.

4.2.2 Subjectivism

Subjectivism is the opposite epistemological extreme to objectivism and refers to knowledge based only on the knowledge seekers (the researcher's) subjective understanding of the object in question. Subjective meaning is therefore imposed on the object (the phenomenon of interest) by the subject (the researcher), and that meaning is not a direct result of an interaction between the subject and object (Crotty, 1998). Consequently, according to this view, the answer to the research question lies within the beliefs and feelings of the researcher involved. If a strict subjectivist approach was adopted to address the present research question, then the results would represent my own feelings and beliefs regarding how people successfully change their PA habits. This information would therefore only be representative of my own stance on the research question and would not be grounded in any interplay with, or data representative of the phenomenon of interest. Consequently emphasising subjective activity exclusively, overlooks the role of social and natural influences (Ratner, 2008). Clearly any subjective account of a human behaviour change process that occurs and is experienced by a variety of individuals in the external world is likely to lack ecological validity. As a result, it has been suggested that subjectivism in its strictest form can be problematic in social science (Bunge, 1993; Gergen, 2001; Ratner, 2008).

4.2.3 Constructionism / Constructivism

Within the social sciences, Denzin and Lincoln (2008) suggest that there is an increasing emphasis on adopting alternatives to positivistic and post-positivistic perspectives and paradigms. Bloland (1995) also described a distinct turn towards interpretative, postmodern, criticalist practices, which are often representative of a constructionist epistemology. From the constructionist viewpoint, meaning cannot be described simply as objective, and by the same token it cannot be described simply as subjective. The constructionist view suggests that meaning is not discovered, but constructed by human beings as they engage with the world and the objects they are interpreting. In constructionism, it is acknowledged that the object cannot be interpreted without an observer, who can never fully be detached from culture and past experience when giving meaning to the object (Burr, 1995). Therefore, in order to investigate how people change their PA related behaviour, a constructionist would engage with

individuals who are changing their behaviour in that context, in an attempt to report on and interpret individual observations, experiences, knowledge etc.

Unlike the positivistic and postpositivistic approaches associated with objectivism, constructionist approaches do not involve generated prior assumptions or hypotheses with regards to the factors that may or may not be involved. Therefore, constructionism potentially allows for a more exploratory approach to be adopted. Also, unlike subjectivism, constructionist approaches acknowledge the importance of engaging with the environment in question. Therefore, a constructionist epistemology will ultimately inform a research approach that allows for the construction of knowledge of the PA behaviour change process, which is grounded in the experiences of relevant stakeholders (e.g. those who have successfully changed their PA participation habits). Consequently, there is potentially much to be learnt about PA behaviour change from this perspective, which has not been addressed using more dominant positivistic and postpositivistic approaches. As a result I have adopted a constructionist epistemological viewpoint to address the current research question.

Within this epistemological viewpoint, it is important to distinguish between the terms *constructionism* and *constructivism*. Crotty (1998) explains that although the terminology in the literature is far from consistent, constructionism refers to situations where the social dimension of meaning is at centre stage, whereas constructivism is primarily an individualistic understanding of the constructionist position. As a result, constructivism is generally referred to as a paradigm rather than an epistemological perspective (e.g. Guba & Lincoln, 2008) because it represents a set of beliefs underpinned by a constructionist epistemology. For constructionists, knowledge and meaning are shaped by culture and social processes, and involve collective generation and transmission of meaning (Crotty, 1998). In order to make this distinction clearer, some have labelled this approach "social constructionism" (Gergen, 1985). Constructivists, on the other hand, take this a step further by recognising the contribution and meaning making activity of the individual mind, and view objective knowledge and truth as the result of individual interpretation (Schwandt, 1994).

For the purposes of this research, it is important to demonstrate how these two viewpoints influenced the design of this GTM study. In order to obtain knowledge regarding PA behaviour change that is grounded in the experiences and perceptions of those involved in the change process, the contribution of culture and social constructions must be acknowledged. Therefore, from a constructionist epistemological viewpoint knowledge regarding PA behaviour change can be constructed through

culture and social exchange (Crotty, 1998), which will be reflected in the experiences and perceptions of those involved. However, in order to report and gather this knowledge, and present the results of this study, my own interpretation of these socially constructed understandings will be required (constructivism). Consequently, the GTM adopted in this thesis is informed by the constructionist epistemological viewpoint but is ultimately representative of a constructivist paradigm. However, in order to understand why GTM and constructivism were ultimately adopted, it is important to describe and consider some of the different theoretical perspectives associated with constructionism.

4.3 Theoretical Perspectives and Paradigms associated with Constructionism

A number of theoretical perspectives are associated with a constructionist epistemology, including interpretivism, critical enquiry and feminism. It is beyond the scope of this thesis to discuss each of these in detail (See Crotty, 1998; Denzin & Lincoln, 2008 for a more detailed account of these); therefore this section of the chapter will focus predominantly on the perspectives that informed the chosen methodology, the constructivist revision of GTM (Charmaz, 2000, 2006).

4.3.1 Interpretivism

The theoretical perspective of interpretivism is central to the GTM adopted in this thesis. Interpretivism "looks for culturally derived and historically situated interpretations of the social-life world" (Crotty, 1998 p.67). From an interpretivist perspective, human action is distinguishable from the movement of physical objects because it is inherently meaningful (Schwandt, 2003). However in order to find meaning in human action, it needs to be interpreted in a particular way. Historically, interpretivism is represented by three theoretical perspectives: phenomenology, hermeneutics, and symbolic interactionism (Crotty, 1998).

4.3.1.1 Phenomenology

Phenomenology refers to the study of 'phenomena' or the things themselves. It suggests that if we lay aside the prevailing understanding of those phenomena and revisit our immediate experience of them, possibilities for new meaning emerge (Crotty, 1996). From a phenomenological perspective, researchers attempt to understand how people attend to the world in the context of four existentials: temporality (lived time), spatiality (lived space), corporeality (lived body) and relationality (lived human relation) (Van Manen, 1990). Therefore, phenomenologist's focus on the lived experience and believe that human behaviour occurs in the context of relationships to things, events,

people etc. Experience in phenomenology is considered to be an individuals perceptions of his or her presence in the world (Richards & Morse, 2007), which in turn, represents a form of interpretation. Based on this, phenomenology generally addresses questions concerned with meaning (e.g. what is the meaning of....?) and about the core essence of phenomena or experiences (Richards & Morse, 2007).

As explained previously, the primary focus of this study is to understand a process which currently lacks a sufficient theoretical framework (PA behaviour change). From a phenomenological perspective, successful PA behaviour change (the phenomenon of interest) can be understood through the lived experiences (interpretations) of people who represent that phenomenon. Therefore, research undertaken from a phenomenological perspective would likely result in understanding grounded in lived experiences of successful change. However, phenomenology attempts to gain insightful descriptions or plausible insights into these lived experiences but does not profess to generate effective theory that enables us to explain reality (Van Manen, 1990). Consequently, in order to move beyond rich description and start theorizing about the processes involved in successful PA behaviour change, it may be necessary to consider alternative interpretive perspectives.

4.3.1.2 Hermeneutics

Historically, hermeneutics is the science of biblical interpretation (Crotty, 1998). It refers to the interpretation of text or scripture based on the assumption that text and speech created by humans are all expressions of meaning. Hermeneutics are traditionally used to answer historical research questions where sources such as scripture, text and art provide the greatest, and often the only, insight into the chosen subject. However more recently, it has been adopted by the human sciences to inform research questions relating to intentional human behaviour and human institutions (Benton & Craib, 2001). From this perspective, understanding is historical (Gadamer, 1989). For example, to understand PA behaviour change, we would need to understand the historical origins that shaped it (e.g. cultures & traditions). Therefore, hermeneutics views prejudices and prejudgements of the historical moment as key sources of understanding. Consequently, any interpretation of the PA behaviour change process would represent a negotiation between what the objects of our interpretation say and our underlying anticipatory prejudices. However, there are arguably limitations to this perspective when it is applied to situations where human actions and interactions may be central to the understanding and where historical interpretations have previously

been called into question. Specifically, it overemphasizes the authority of tradition (Benton & Craib, 2001) and fails to acknowledge the possibility that understanding can be generated by setting aside historical interpretations and focusing on more contemporary sources of information.

4.3.1.3 Symbolic Interactionism

Symbolic interactionism is a theoretical perspective grounded in the belief that understanding is derived from and arises out of the social interaction that one has with the person or culture being studied (Crotty, 1998). It assumes that people can and do think about their actions rather than just responding mechanically to stimuli (Charmaz, 2006). Therefore, from this perspective, human actions are representative of the meanings that they possess for the individuals involved, and this meaning is derived from social interactions. As explained previously, this study seeks to gain an understanding of PA behaviour change that is grounded in the perspectives of individuals within that context. By accepting that these perspectives can provide meaning and knowledge regarding the PA behaviour change process, this thesis is actively embracing social interactionism and a belief in socially constructed meaning. Therefore, the chosen methodology (GTM) was informed by the theoretical perspective of symbolic interactionism.

In order to present a more in-depth justification for adopting GTM, the remainder of this chapter presents a detailed summary of GTM and its historical underpinnings. This details how GTM has been influenced by ongoing epistemological debates and clarifies my position with regards to these.

4.4 Methodology

4.4.1 The Grounded Theory Methodology (GTM)

Based on a constructionist epistemological stance and the interpretive theoretical perspective of symbolic interactionism, the chosen methodology for this investigation is the constructivist revision of the GTM. The GTM represents a systematic, yet flexible methodology for collecting and analysing qualitative data to construct theories that are grounded in the data themselves (Charmaz, 2006). It offers an alternative to the positivistic and postpositivistic research approaches traditionally employed in the investigation of PA behaviour change because it does not restrict potential findings to pre-existing concepts and constructs. By examining PA behaviour change processes using GTM, the findings of this study also have the unique quality of being grounded in

the perceptions and experiences of the individuals involved as opposed to pre-existing theoretical accounts of human behaviour.

4.4.2 Why the Grounded Theory Methodology?

As demonstrated in Chapters 2 and 3, previous attempts to understand PA behaviour change have generally focussed on positivistic and postpositivistic research approaches (e.g. Marcus et al. 1992). For example, previously developed models such as the TTM have been tested using rigorous quantitative approaches, such as meta analysis (e.g. Marshall & Biddle, 2001), to ascertain whether the constructs proposed by TTM can be applied to PA or exercise related behaviours. The obvious limitation with this type of research is that only processes already proposed by the model can be examined and any additional processes that may be occurring will be ignored. By utilising previously developed models of behaviour change, researchers also need to consider what they are grounding their newly acquired knowledge of PA behaviour change in. For example, if the model being applied to PA behaviour change was developed within smoking cessation, then any constructs taken from that model are directly representative of smoking behaviour change not PA behaviour change.

The GTM offers an alternative perspective to objective positivistic research methods by allowing the research endeavour to remain open to all theoretical possibilities and construct understanding that is grounded in the perspectives and experiences of those involved. It is an exploratory methodology, traditionally used to generate theory in areas where there is little already known (Goulding, 1998). However, its usefulness is also recognised where there is an apparent lack of integrated theory in the literature (Goulding, 2002). While this thesis acknowledges that there is a considerable existing body of literature surrounding PA participation, less is known about long term change (See Chapter 2, Section 4) and a potential limitation with much of what has been learnt is a product of a dominant objectivist stance. By utilizing systematic, yet flexible methods for collecting and analysing qualitative data, it allows researchers to construct theories that are grounded in data collected from PA behaviour change settings. Locke (2001) explains that GTM adapts well to capturing the complexities of the context in which the action unfolds and emphasises process. Therefore, GTM offers an alternative, arguably more appropriate way of investigating the processes and mechanisms involved in PA related behaviour change to assist in the development of an explanatory theoretical model grounded in relevant empirical data (Glaser & Strauss, 1967).

4.5 The Emergence and Development of Grounded Theory

The GTM was originally developed by sociologists Barney Glaser and Anselm Strauss (1967) at a time when social science was starting to become dominated by positivistic methodologies which neglected the value of inductive, qualitative methods for developing theory (Glaser & Strauss, 1967). Glaser and Strauss proposed that systematic qualitative analysis had its own logic and could generate theory. Charmaz (2006) explains that the 'discovery' of GTM provided a powerful argument that legitimatised qualitative research as a credible methodological approach in its own right. Specifically, in their original publication, Glaser and Strauss (1967) presented some revolutionary ideas regarding research methodologies and methods. They challenged beliefs that qualitative methods were impressionistic and un-systematic and that data collection and analysis phases of research should be separate. They also challenged the prevailing views of qualitative research as a precursor to more rigorous quantitative methods and the assumptions that qualitative research could not generate theory. As a result, since Glaser and Strauss's early publications, a growing acceptance of GTM can be observed (Bryant & Charmaz, 2007). However, although Glaser and Strauss set out to counter dominant positivistic practices of the time, they did so in a manner consistent with the epistemological viewpoints that inform those very practices. Specifically, their original statement of the GTM professed an objective, positivistic epistemological orientation, that assumed a unitary reality was there to be discovered, explored and understood (i.e. theory will emerge from the data). However, it has recently been suggested that whether or not Glaser and Strauss each individually realized it, their approach implied far more than this view, because both constructionist and ethnomethodological viewpoints were evident in their writings (Bryant & Charmaz, 2007). Specifically, Bryant and Charmaz highlighted that much of Glaser and Strauss' research that led to the discovery of GTM, did appear to acknowledge socially constructed realities and the importance of the interpretive practices of the social actors involved (e.g. Glaser & Strauss, 1965; 1968).

Historically, GTM originally brought together two contrasting and competing traditions in sociological research, represented by its two originators and their academic backgrounds. Glaser represented Columbia University's positivistic traditions and imbued GTM with empiricism, rigorous codified methods and an emphasis on emergent discoveries. Strauss, on the other hand, represented Chicago University's more pragmatic, qualitative traditions and brought notions of social and subjective meanings and a more open-ended approach to GTM (Charmaz, 2006). By marrying these two

schools of thought, their original publication proposed that qualitative methods can be used in a systematic manner to facilitate the construction of theory from the data itself. However, based on the evidence described above, this was presented in a manner that has been accused of being philosophically naïve (Layder, 1998).

Consequently, as the popularity of GTM increased across a range of academic areas, considerable debate emerged regarding how best to achieve a grounded theory. Specifically, GTM has been interpreted and described in a variety of ways based on different epistemological and theoretical viewpoints. For example, the original Glaser and Strauss (1967) text was criticised for being too abstract and Strauss and Corbin's (1990) subsequent text was written with this in mind. However, this in turn was criticised by Glaser (1992) for being too prescriptive and for forcing theory to emerge. This emergence versus forcing debate led to the development of a number of different approaches to GTM, which reflect different theoretical standpoints. These were generally representative of either; Glaser and Strauss's original texts (Glaser & Strauss, 1967; Glaser, 1978) or Strauss and Corbin's subsequent revisions (Strauss & Corbin, 1990, 1994, 1998; Corbin & Strauss, 2008). Therefore, since the original publications, Glaser remained consistent with the earlier descriptions of the method and thus defined GTM as a methodology of discovery, treated categories as emergent from the data and analysed a basic social process (Charmaz, 2006). Strauss (1987) on the other hand attempted to move the methodology forward by responding to earlier criticisms concerning the lack of information regarding the actual methods and processes associated with GTM. As a result his co-authored works with Juliet Corbin (Strauss & Corbin, 1990, 1994; 1998) generally outline more technical prescriptive procedures, providing researchers with more usable guidelines for implementing GTM.

More recently, GTM has continued to evolve based on the work of a number of different researchers (e.g. Bryant, 2002; Charmaz, 2000, 2002, 2006; Clarke, 2005) and a distinction has been made between objectivist and constructivist revisions of GTM (Bryant, 2002; Charmaz, 2000, 2002, 2006). This distinction represents an attempt to reposition GTM in the light of the current philosophical and epistemological landscape (Bryant & Charmaz, 2007).

4.5.1 The Constructivist Revision of the Grounded Theory Methodology

As explained above, the original GTM texts (Glaser & Strauss, 1967; Glaser, 1978) refer to discovering theory as emerging from data separate from the scientific observer or researcher involved. Therefore, despite setting out to counter the dominant

positivistic practices of the time, they appeared to still conform to a naïve or scientific realist framework. However, Strauss and Corbin's (1990, 1998, Corbin & Strauss, 2008) subsequent revisions of the methodology, appeared to move away from this position towards a more interpretive stance by acknowledging the researcher as an active part of the theory generating process because. However, in attempts to outline more usable guidelines for conducting GTM, they described a number of technical prescriptive procedures, which again, communicated a more objective stance. Glaser (1992), in response, viewed this as a violation of the more restrained approach, in which researchers remain entirely distant and independent from the phenomenon under study. Ultimately, this debate surrounding the role of the researcher in the knowledge construction process has led to another notable revision of the methodology, proposed by Charmaz (2000, 2006), which acknowledges the constructivist perspective or paradigm described earlier. Unlike the more traditional approaches, Charmaz assumes that neither data nor theories are discovered. Rather, she identifies the fact that we are part of the world we study and the data we collect, and suggests that grounded theories are constructed through our past and present involvements and interactions with people, perspectives and research practices (Charmaz, 2006).

Bryant and Charmaz (2007) argue that "the constructivist revision of GTM builds on the fluid, interactive and emergent research process of its originators, but seeks to recognise partial knowledge, multiple perspectives, diverse positions, uncertainties and variation in both empirical experience and its theoretical rendering" (p.51). Therefore, it represents a revision of GTM that has attempted to recognise and position itself accordingly with regards to the epistemological debates of the time. As explained previously, a constructionist epistemology is central to the current research question because knowledge regarding PA behaviour change will be constructed from the experiences and perceptions of those involved. However, it is also recognised that this knowledge will ultimately be constructed as a result of my own involvement and interpretations. Therefore, the constructivist revision of GTM has clearly been embraced. Charmaz (2006) explicitly argues for building on the pragmatist underpinnings in GTM and advancing interpretive analyses that acknowledge these constructs:

"At each phase of the research journey, your readings of your work guide your next moves. The combination of involvement and interpretation leads you to the next step. The end point of your journey emerges from where you start, where you go, and with whom you interact, what you see and

hear, and how you learn and think. In short the finished work is a construction – yours” (Charmaz, 2006, p.xi).

Clearly constructivism informs methodologies that are likely to appear flexible in nature (i.e. not a strict, replicable process or set of specific methods) due to the potential variations in human interpretations. Therefore, despite following the constructivist revision of GTM, many of the techniques and methods used in the development of this grounded theory are applicable to a range of GTM interpretations and broader qualitative approaches. However, the methods described in this thesis are specifically informed by the underlying principles of the GTM and a constructivist perspective. Therefore, in order to ensure that the methods employed remained consistent with this, it was necessary to present a detailed justification for the chosen methods employed.

4.6 Grounded Theory Methods

As an increasing number of researchers embraced GTM as a valid research methodology, the question - how to achieve grounded theory? became a popular debate. Consequently, GTM studies usually represent a variety of interpretations based on the different revisions of the methodology that have been presented. While this continued refinement of GTM may represent a healthy evolutionary process, it also has the potential to present researchers with contradictory information regarding how to conduct GTM based research, particularly for those who are new to the approach and who are not aware of these different schools of thought. Based on this, Stern (1994) believes that many researchers who claim to be using GTM are actually muddling methods. Charmaz (2003) also questions the extent to which many researchers actually follow a true GTM and argued that there is a tendency to construct conceptual analyses instead of a substantive theory that is grounded. In other words, results often identify a descriptive account of the concepts that pertain to a particular phenomenon, but fail to demonstrate interrelations between these concepts to form a theory from which hypotheses can be generated. Charmaz (2003) also suggested that while many researchers engage in techniques associated with GTM, such as coding and memo-making, they often fail to engage in additional important processes such as an in-depth analysis of categories. These quality control concerns have been echoed within the sport and exercise psychology literature (Bringer, Johnston & Brackenridge, 2004).

Corbin and Holt (2004) provide a good summary of the current situation by describing GTM as a methodology in flux, which has different meanings to different people. As explained in Chapter 1 (Section 2) this thesis addresses both conceptual and methodological issues. Consequently, the following chapter (5) argues that although different interpretations of the GTM approach exist, there are a number of common characteristics that should be evident in all GTM studies. Specifically, the differences between the various revisions are often largely technical or procedural, in order to accommodate different theoretical positions (e.g. the extent to which the researcher assumes a more active or passive role), whereas their fundamental definitions of GTM are much more similar. For example, Strauss and Corbin (1990, 1998; Corbin & Strauss, 2008) extol the virtues of an organisational scheme called the paradigm model, which is designed to help analysts systematically gather and order data in such a way that structure and process are integrated into their analysis. However, it has been argued that the paradigm reflects quite an objective stance because it encourages researchers to fit their data to a framework. Despite this, the paradigm model still represents an attempt to encourage theoretical density within the emergent understanding, which is a characteristic or common goal for all GTM interpretations (Corbin & Strauss, 2008; Charmaz, 2003, 2006; Glaser & Strauss, 1967; Glaser, 1978; Strauss & Corbin, 1998, 1990; Strauss, 1987).

In order to address the methodological strand of the thesis and ultimately ensure that the methods employed are consistent with the basic tenets of GTM, Chapter 5 reports on an investigation into the key defining characteristics of GTM based research. In addition, to further develop the knowledge base and legitimise the use of GTM within exercise psychology, a review of GTM applications within this academic domain is conducted to identify how the key tenets or common defining characteristics of GTM are being incorporated into research designs. The implications of this will be valuable to the exercise science and wider research communities and will inform the methods and procedures employed in this GTM driven investigation.

4.7 Chapter Summary

Clearly GTM methods have evolved and are being applied in different ways, depending on the perspectives (and understanding/competence of GTM) of the researcher. Therefore, by exploring and stating the underlying epistemological and theoretical perspectives, researchers are able to provide insight into this process and ultimately acknowledge the limits of their studies (Charmaz, 2006). Consequently, the

aim of the current chapter was to present this information, and in doing so, provide justification for the methodology and subsequent methods adopted in this thesis. In the case of this thesis, the epistemological stance (constructionism) and theoretical perspective (symbolic interactionism) offer an alternative perspective from which a number of potential criticisms are evident in previous PA behaviour change related research. As a result, it has been argued that the current theoretical understanding of PA behaviour change is limited and there is a need to develop a more ecologically valid account of this human change process. This perspective has informed a decision to move away from traditional positivistic approaches and adopt the GTM to develop a theoretical understanding that is grounded in the perceptions and experiences of individuals within the PA behaviour change context.

In the original GTM text Glaser and Strauss (1967) described how the approach can be used to develop or generate novel theories instead of verifying existing ones. As a result, they urged social researchers to go into the field to gather data without ready prepared theoretical frameworks to guide them. While the epistemological and theoretical underpinnings described in this chapter, appear to fit with Glaser and Strauss's intended use for GTM, as explained previously, considerable debate emerged surrounding how to achieve this. These ongoing debates reflect the different epistemological interpretations of GTM, including the constructivist revision adopted in this thesis. A consequence of this has been an increase in confusion among novice GTM users regarding what methods to employ when adopting a GTM based approach. Therefore, in order to ensure that the methods employed in this study remain consistent with the GTM and my own constructivist perspective, it was crucial for me to explore these debates in more detail to help inform my choice of appropriate methods. The following chapter (5) addresses this by attempting to identify both the defining characteristics of GTM and the evidence base for the application of these in exercise psychology related research. Consequently, the implications of Chapter 5 represent valuable guidelines, for both the current research endeavour, and the wider exercise psychology research community regarding how to conduct GTM based research.

Chapter 5: A Critical Review of Grounded Theory Based Research within Exercise Psychology

5.1 Introduction

As explained in Chapter 4, GTM has been selected as the most appropriate methodology for addressing the current research question. This was achieved by reflecting on my own epistemological and theoretical position. However, the literature reveals that GTM is not a clearly defined methodology and as a result, has been interpreted in a variety of different ways (See Chapter 4). In addition, a number of researchers have questioned the extent to which many studies actually follow a true GTM (e.g. Charmaz, 2003). These concerns have also been voiced within the sport and exercise science literature (Bringer et al., 2004). Therefore, to further legitimise GTM as a form of enquiry within exercise psychology and to encourage greater research rigour in all GTM applications, it is crucial that it is applied accurately to deal with appropriate research questions. The purpose of this chapter is to critically review the current body of GTM based research within exercise psychology, to provide an overview of how it is being applied within this academic domain. To conduct this review, guidelines for assessing GTM based research were developed based on the defining characteristics of the method and other published recommendations for assessing qualitative research. Ultimately, this chapter demonstrates that much of the research conducted within exercise psychology, that claims to utilise GTM, fails to acknowledge many of the key tenets of this approach. The applied implications of these findings represent guidelines, which go on to inform the current research project and also represent important implications for future applications of GTM.

5.2 Determining GTM Research Quality

In conjunction with the growth of qualitative work generally, there has been a call for the development of agreed assessment criteria to help discern quality in qualitative research (Popay, 2005). However, it is arguably impossible to agree and apply one set of quality criteria to the wide range of epistemological and methodological approaches used within the qualitative research domain. In 2004, it was noted that whilst there are now more than 100 proposals on quality in qualitative research, there is “little evidence of common ground” (Dixon-Woods, Shaw, Agarwal & Smith, 2004, p. 223). In recognition of the fact that qualitative research is not a unified field, several authors have suggested that more specific criteria need to be developed in

order to account for the diverse range of methodological approaches and modes of data collection and analysis adopted. For example, assessment criteria developed to address an interview based GTM study is likely to look quite different from criteria developed for a discourse analytic study of archived policy documents (Daly et al., 2007; Dixon-Woods et al., 2004; 2006). Sparkes (2001) recommends that evaluative criteria should be commensurable with the aims, objectives and epistemological assumptions of the research project. Therefore, in order to identify a suitable approach for assessing GTM based research, it is necessary to consider its specific defining characteristics from a methodological perspective, and yet still recognise the potential for variation from an epistemological perspective.

A range of characteristics and viewpoints have been proposed to identify evaluative criteria for GTM based research (Charmaz, 2006; Glaser & Strauss, 1967; Glaser, 1978; Strauss & Corbin, 1998). These generally reflect the epistemological and theoretical positions of the authors in question and as a result do vary with regards to the characteristics that they emphasise. For example, Glaser and Strauss (1967; Glaser, 1978, Strauss, 1987) argued that GTM based research should be assessed based on a detailed description of the actual strategies used for theory generation. Charmaz (2006) summarises the following defining characteristics from Glaser and Strauss's early publications as follows: concurrent involvement in the data collection and analysis phases of research (to allow for an iterative process to occur, whereby early emergent findings can inform subsequent analytical procedures), the construction of analytic codes and categories from the data itself and not from preconceived logically deduced hypotheses, use of the constant comparative method (making systematic comparisons during each stage of the analysis between observations and categories), advancing theory development during each step of data collection and analysis, memo writing to elaborate categories and relationships, sampling aimed specifically toward theory construction, and conducting a more detailed literature review after the analysis process. While the above criteria do highlight a number of commonly accepted GTM characteristics, they are largely methodological and as a result, may fail to fully capture the grounding principles and iterative theory building process associated with this approach. For example, the methods of a study could include all of the above characteristics but still fail to demonstrate a broader understanding of the rationale, research processes and assumptions behind the chosen methodology.

According to Strauss and Corbin (1998), GTM is a theory building process, concerned with developing a valid and grounded theory that speaks to the issues and

concerns of those we study. Based on this, Strauss and Corbin (1998; Corbin & Strauss, 2008) identified a set of questions designed to assess both the adequacy of the GTM process and the grounding of its findings. Charmaz (2006) outlined a similar set of questions designed to evaluate GTM based on its credibility, originality, resonance and usefulness. She argues that any attempt to examine the quality of GTM based research needs to look beyond specific methodological procedures and attempt to capture thick description regarding the entire research process. This should allow for an accurate assessment of GTM quality that accounts for the diverse nature of the method and range of methodological criteria involved. Therefore, the more recent GTM writings appear to acknowledge its interpretive nature and the subsequent need to adopt more descriptive measures, which recognise the potential for variations across different revisions and ultimately capture an accurate account of the research process as a whole.

This chapter argues that, despite the fundamental epistemological differences described previously, a number of commonalities across the different interpretations or stands of GTM exist. These generally represent common goals that relate to specific aspects of the GTM process and could be described as the key tenets or characteristics of GTM. Based on this, attempts to develop evaluative criteria for GTM, should endeavour to seek out evidence of these key characteristics. Consequently, this chapter identifies those key tenets and demonstrates how they can be used as part of an evaluative framework for eliciting relevant descriptive information from GTM based studies. Ultimately, the aim of this chapter is to critically review the use of GTM within exercise psychology, to highlight how it is being interpreted and applied within this context.

5.3 Methods

5.3.1 Criteria for Evaluation

By reviewing the major texts or literature sources that represent the different interpretations of GTM (Corbin & Strauss, 2008; Charmaz, 2003, 2006; Glaser & Strauss, 1967; Glaser, 1978; Strauss & Corbin, 1998, 1990; Strauss, 1987), the following list of common GTM characteristics was identified:

- Sampling aimed at facilitating theory generation.
- Concurrent involvement in data collection and analysis phases of the research (an iterative process).

- The development of initial concepts and categories from the data itself, which cover a wide range of empirical observations.
- The advancement of theoretical development during each step of data collection and analysis.
- Always remaining open to new possibilities emerging from the data.
- Making systematic comparisons
- Evidence of theoretical density, resulting in the presentation of a theory from which hypotheses can be generated (i.e. clear links between individual categories & subcategories/dimensions & the larger core category).
- Evidence that theoretical saturation was achieved (when new data reveals no new theoretical insights).
- Rich description of the entire research process, including justification for all the decisions made (transparency).

Using these characteristics and both the original defining characteristics of GTM, identified by Glaser and Strauss (1967; Glaser, 1978; Strauss, 1987) and the evaluation criteria outlined by Strauss and Corbin (1998, 2008) and Charmaz (2006), a more concise list of questions designed to retrieve relevant descriptive information GTM based studies was developed (See Table 5.1). The questions were based on characteristics common to all major revisions of GTM (See above list). In order to account for potential variations across different revisions, questions were worded to ensure that a transparent account of the entire research process was captured. This aimed to encapsulate rich descriptive information relating to not only the methods and techniques employed but also the aims, objectives and epistemological assumptions behind each research project. It is important to stress that this evaluative criteria is not intended as a checklist, but as a guide for assessing the quality and general application of GTM within the reviewed studies. By answering these questions an overall picture of the quality of each study was obtained.

Table 5.1 Questions to Guide the Extraction of Study Quality Related Information

<ul style="list-style-type: none"> • Is GTM an appropriate methodology for this research? <ul style="list-style-type: none"> - Was a justification presented for adopting a GTM based approach? If so what was it? - How was GTM defined? (e.g. As a research methodology or simply a data analysis tool?)
<ul style="list-style-type: none"> • Was sampling conducted in accordance with the tenets of GTM? <ul style="list-style-type: none"> - What evidence is there to suggest that sampling was conducted to facilitate theory generation? - How was the initial sample selected? On what grounds? - Did theoretical formulations guide some of the data collection, if so how? - Based on the answers to the above two questions did theoretical sampling occur? - Is there evidence of simultaneous involvement in data collection and analysis?
<ul style="list-style-type: none"> • How were the initial concepts and categories developed? <ul style="list-style-type: none"> - What initial concepts and categories were presented? - What techniques were used to construct or develop these categories (coding, memo writing, comparisons, use of attributes etc.)? - What evidence is there to suggest that these concepts or categories were generated from the data itself and not from pre-conceived logically deduced hypotheses? - Do the initial categories cover a wide range of empirical observations, was the initial focus broad?
<ul style="list-style-type: none"> • How did theoretical development continue after the initial concept identification? <ul style="list-style-type: none"> - How did theory development advance during each step of data collection and analysis? - What major categories were presented? - What techniques were used to construct or develop these categories (e.g. axial or focused coding, systematic comparisons, questioning etc.)? - What evidence is there to suggest that the constant comparison method was used? i.e. were systematic comparisons made between observations and between categories? - Are the categories theoretically dense? Are there clear links between individual categories and sub-categories as well as between individual categories and the larger core category? Have the dimensions of categories and subcategories been explored?
<ul style="list-style-type: none"> • What was the end product of this research and how was it finally constructed? <ul style="list-style-type: none"> - How and why was the core category selected? On what grounds were the final analytical decisions made? - What evidence is there to suggest that the study achieved theoretical saturation? - What conclusions were drawn? - What evidence is there to suggest that the results offer new insight into the studied phenomenon?

5.3.2 Review Protocol

Systematic reviews have rapidly become the cornerstone for the evidence based practice and policy movement (Dixon-Woods et al., 2006). Traditionally, systematic review guidelines encourage the use of rigorous quantitative designs. However, when randomised controlled trials or rigorous observational studies are not the focus of the investigation, descriptive literature reviews are encouraged (Fink, 2005). Due to the methodological focus of the current review a descriptive, narrative approach was utilised to encourage the extraction of rich, detailed information about each study.

5.3.3 Sources

Electronic searches of computerized databases were conducted to locate relevant studies (SPORT Discus, PsycINFO, CSA Physical Education Index, PubMed, Science Direct, Web of Science, Scopus). Keyword combinations for electronic database searches included: Grounded Theory + Sport, Grounded Theory + Physical Activity, Grounded Theory + Exercise. Figure 5.1 illustrates the study selection process and results of the filtering process. For inclusion, reviews of research literature usually apply methodological screening criteria to control for variations in the quality of different research studies (Fink, 2005). However, this review is interested in identifying and reporting on such variations. Therefore only the following inclusion criteria were applied:

1. English language studies.
2. Published in a peer-reviewed journal.
3. Publications between 1967 (The discovery of GTM) and August 2008 inclusive.
4. Exercise psychology related research.
5. Studies that explicitly state adopting a GTM or grounded theory methods.

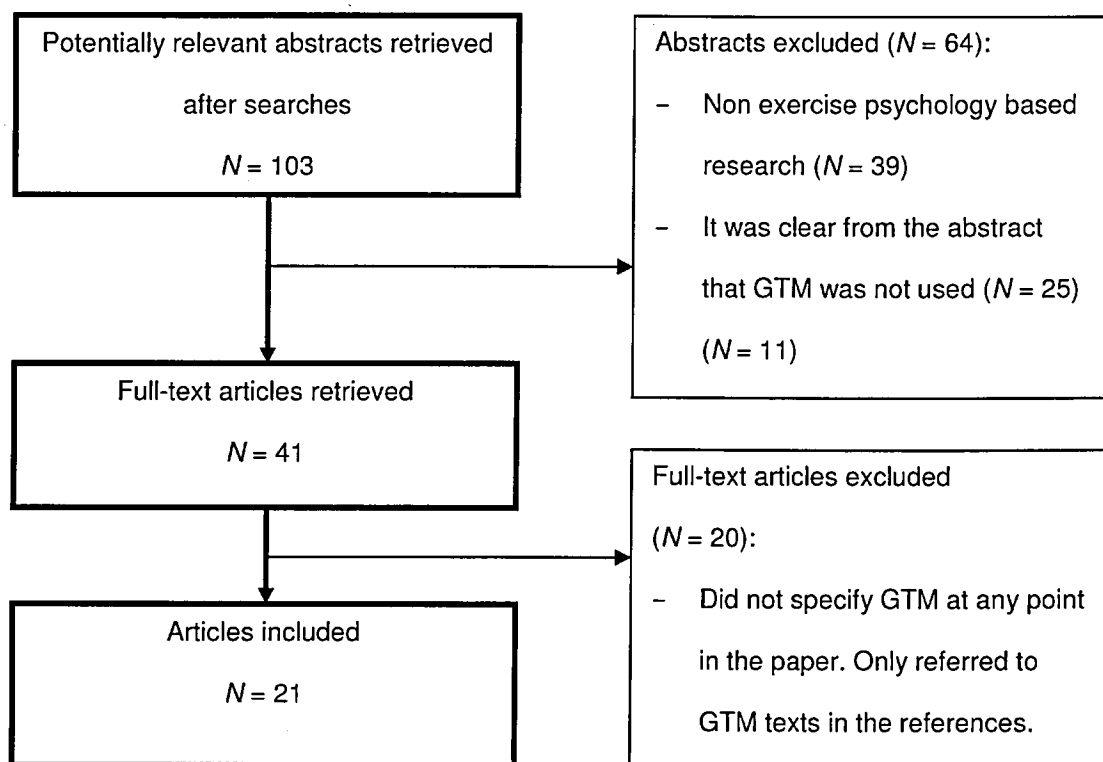


Figure 5.1 Study Selection Process

5.3.4 Procedure

Hard copies of all relevant publications, according to the inclusion criteria, were obtained. First, summary characteristics were retrieved for each study (See Table 5.2). Second, descriptive sample characteristics relating to the remaining study quality criteria specified in Table 5.1 were extracted (See Table 5.3).

5.4 Results

5.4.1 Study Characteristics

The review identified 21 articles published between 1999 and 2008. Of these studies, 11 (53%) were conducted since the year 2005. Sample sizes ranged from 7 to 500 however, 71% (15) of the studies reported samples of <35 participants. Data was collected using the following methods: un-structured and semi-structured interviews (90% of studies), focus groups (29% of studies) and questionnaires (10% of studies). Six of the 21 studies (29%) used more than one method of data collection. Eight of the 21 studies (38%) provided no rationale to explain why GTM or grounded theory methods were used. Nine (43%) reported using GTM throughout the entire study or recognised it as a research methodology, and 12 (57%) reported using grounded theory

methods to either collect or analyse data. Thirteen (62%) of the reviewed studies referenced Strauss and Corbin's GTM revision (1990, 1998). Eight (38%) referenced Charmaz's social constructionist or constructivist revisions (1990, 1995, 2000, 2002 2006). Two (10%) referenced Glaser and Strauss's (1967) original text. Only three (14%) cited multiple GTM revisions.

Table 5.2 Characteristics of Reviewed Studies

Author(s) and Date of Publication	Journal	Description of Study	Participants	Was Justification Presented?	Role of GTM	Revisions of GTM Followed
Lindgren and Fridlund (1999)	Women Sport & Phys Act J	Develop a theoretical understanding of what could influence exercise adherence in physically non-active young women	12 physically non-active women took part in semi-structured interviews	Yes	"Interviews were analysed using grounded theory"	Strauss & Corbin (1990)
Bamber et al. (2000)	Br J Sports Med	Explore the concept of exercise dependence	16 female exercisers took part in semi-structured interviews	Yes	"A qualitative approach based on the constructionist revision of grounded theory was adopted"	Constructionist Charmaz (1990)
Lindgren et al. (2000)	Women Sport & Phys Act J	Examine how sport influences women's lifestyles and attitudes to sport in adult life	17 women took part in semi-structured interviews	Yes	"Data was analysed using the grounded theory method"	Strauss & Corbin (1990)
Currie & Devlin (2002)	Health Care for Women Int	Explore the perceived benefits, barriers and stigma associated with pram walking exercise groups	500 women contributed to 450 structured interviews and 50 focus groups	No	"Major themes were analysed according to the grounded theory procedures"	Strauss & Corbin (1990)
Chii et al. (2002)	J Advanced Nursing	Explore exercise experiences of heart transplant patients	8 adult heart transplant patients took part in in-depth interviews	Yes	"The study was conducted based on grounded theory"	Strauss (1993), Strauss & Corbin (1990)
Bamber et al., (2003)	Br J Sports Med	Formulate diagnostic criteria for exercise dependence	56 adult female exercisers took part in semi-structured interviews	Yes	"A social constructionist mode of grounded theory was adopted"	Social Constructionists Charmaz (1990)
Chii et al. (2004)	J Clin Nursing	Explore exercise experiences of post-menopausal women	12 post-menopausal, regularly active women took part in in-depth interviews	Yes	"A grounded theory research design was used"	Strauss (1993), Strauss & Corbin (1990)
Wenneberg et al. (2004)	Disability & Rehab	Evaluate the subjective experiences of patients with muscular dystrophy practising a novel exercise programme.	28 patients took part in semi-structured qualitative interviews	No	Grounded theory "guided the qualitative analysis" of this study	N/A
Cox & Orford (2004)	Addiction Res & theory	Explore the meaning of exercise to individuals labelled as 'addicted'	10 people diagnosed as exercise dependent took part in unstructured interviews	Yes	"A grounded theory approach was employed to analyse the data"	Charmaz (1995)
Otter & Currie (2004)	Disability & Rehab	Investigate the psychological effects of a physical activity programme on a group of Vietnam veterans	14 Australian Vietnam veterans took part in a series of 3 focus groups	No	"Grounded theory was used to categorise the main themes to emerge from the data"	Strauss & Corbin (1990)
Crone et al. (2005)	Health Educ Res	Investigate the relationship between PA and mental health for the experiences of participants on exercise referral schemes	18 referral scheme participants took part in semi-structured interviews & focus groups	Yes	"A grounded theory methodology was adopted"	Strauss & Corbin (1998)

Author(s) and Date of Publication	Journal	Description of Study	Participants	Was Justification Presented?	Role of GTM	Revisions of GTM Followed
Concepcion & Ebbeck (2005)	J Sport & Exerc Psych	Examine the mental health benefits of PA for survivors of domestic violence	7 women who had been in abusive relationships took part in interviews	Yes	"A grounded theory approach was adopted for this study"	N/A
Christensen et al. (2006)	Health Educ & Behav	Examine the formation of group cohesion and social support in exercise classes	150 adults contributed to 18 semi-structured interviews and questionnaire data	No	"Analysis was performed according to the grounded theory method"	Corbin & Strauss (1990), Strauss & Corbin (1990)
Lawton et al. (2006)	Health Educ Res	Explore south Asian patients barriers to physical activity	32 adults with type 2 diabetes took part in semi-structured interviews	Yes	"A flexible, open ended approach was achieved using an emergent study design informed by grounded theory"	Glaser & Strauss (1967), Strauss & Corbin (1990)
Whipple et al. (2006)	Am J Health Stud	Understand how individuals maintain PA participation	15 individuals who had trained for at least 1 marathon took part in in-depth interviews	Yes	This study "used a grounded theory approach"	Strauss & Corbin (1998)
Sabiston et al. (2007)	J Sport & Exerc Psych	Explore the psychosocial experiences of breast cancer survivors involved in dragon boat PA programmes	20 female breast cancer survivors took part in semi-structured interviews	Yes	"Interviews were analysed using grounded theory methods"	Constructivist (Charmaz, 2000, 2005)
Priest (2007)	J Health Psych	Explore the psychological benefits of PA for members of a walking group	14 walking group members took part in interviews & discussions	Yes	"Data was analysed using a grounded theory approach"	Glaser & Strauss (1967), Strauss & Corbin (1990), Charmaz (1995)
Burgoyne et al. (2008)	BMC Pub Health	Explore PA determinants in adults from city based neighbourhoods	76 adults took part in either focus groups or interviews	No	"Data was analysed using constant comparison methods with a grounded theory approach"	Strauss & Corbin (1998)
Crone & Guy (2008)	Int J Mental Health Nursing	Explore the role of sports therapy as part of treatment for mental health conditions	11 service users involved in sports therapy took part in focus groups	No	"A qualitative methodology (grounded theory) was used throughout"	Strauss & Corbin (1998), Charmaz (2006)
Giacobbi et al. (2008)	Adapted Phys Act Quarterly	Explore links between physical activity and quality of life for disabled individuals	26 wheelchair basketball players took part in in-depth interviews	No	"Grounded theory interviews and analytical procedures were employed"	Charmaz (2000, 2002)
Groves et al. (2008)	Sport in Society	Explore the relationship between exercise dependence and self-esteem	260 university students contributed to questionnaire and semi-structured interview data	No	"Qualitative data analysis was conducted using grounded theory techniques"	Constructivists (Charmaz, 2002)

5.4.2 Quality of Study Characteristics

5.4.2.1 Was sampling conducted in accordance with the tenets of GTM?

All of the studies selected a seemingly appropriate initial sample. Twelve (57%) of the studies described the rationale behind the selection of their initial sample, thus presented evidence of purposive sampling (e.g. Lindgren, Tebelius & Fridlund, 2000; Sabiston, McDonough & Crocker, 2007). In addition, nine (43%) of the reviewed studies presented evidence of theoretical sampling, whereby simultaneous data collection and analysis occurred and emergent themes were allowed to influence subsequent sampling (e.g. Chii, Shun-Hsuan, Pi-Chen & Lee-Ing, 2004; Whipple, Fetro, Welshimer & Drolet, 2006). One study specified that due to practical constraints it was not possible to carry out data collections and analysis iteratively (Sabiston et al., 2007). In this instance, efforts were made to allow for observed themes (by the researcher) that emerged from early data collections to be explored in subsequent data collections.

5.4.2.2 How were the initial concepts and categories developed?

Sixteen (76%) of the reviewed studies reported generating initial concepts and categories from the data. Yet only five of these presented or described any of these initial concepts and categories (e.g. Bamber, Cockerill, Rodgers & Carroll, 2003; Cox & Orford, 2004). Initial concepts and categories were reportedly generated, using open or initial coding techniques. The nature of the initial or open coding, and the extent to which this process was reported, varied greatly across the reviewed studies. Seven of the studies provided no description of their open or initial coding procedures at all (e.g. Concepcion & Ebbeck, 2005; Currie & Devlin, 2002). Where further description was provided, studies usually described labelling segments of the data to identify raw themes (e.g. Bamber, Cockerill, Rodgers & Carroll, D, 2000; Lindgren et al., 2000). Four of the reviewed studies (19%) reported making comparisons between early themes at this stage in order to identify categories (e.g. Priest, 2007; Wenneberg, Gunnarsson & Ahlstrom, 2004). Memo writing was only reportedly used by three studies (14%) (e.g. Cox & Orford, 2004; Priest, 2007) and no studies described asking questions of their data, at this stage.

5.4.2.3 How did theoretical development continue after initial concept identification?

Theory development advanced in different ways across the reviewed studies and specific details regarding these procedures and the emergent concepts and categories

were often reported in limited detail. Twelve studies (57%) reported using further coding strategies (i.e. axial & focussed coding) to explore emergent concepts and categories (e.g. Cox & Orford, 2004; Crone, Smith & Gough, 2005). These coding procedures were described in a range of different ways. For example, some studies described making comparisons between early themes to develop higher order categories (e.g. Giacobbi, Stancil, Hardin & Bryant, 2008), whereas others utilised a coding paradigm to ask questions of and explore the different dimensions of concepts and categories (e.g. Chii, Fu-Ling & Lee-Ing, 2002; Lindgren & Fridlund, 1999). Ten of the reviewed studies failed to provide any descriptive details of the more advanced coding strategies they reportedly employed (e.g. Christensen, Schmidt, Budtz-Jorgensen & Avlund, 2006; Whipple et al., 2006).

Of the studies that did not explicitly report the use of coding strategies at the theory development stage, many still described additional techniques they employed to encourage theoretical development. Five described using content analysis related techniques (Concepcion & Ebbeck, 2005; Otter & Currie, 2004), whereby initial themes are compared and refined into higher order categories. Of the remaining studies, a range of different techniques were described as a means for advancing theoretical development. These included making comparisons between the data sets and initial codes (e.g. Groves, Biscomb, Nevill & Matheson, 2008), asking further questions in subsequent interviews and modelling (e.g. Priest, 2007). Finally, only three of the reviewed studies (14%) described the data analysis as a non-linear process whereby both open and more advanced coding and analytic techniques were used throughout (e.g. Cox & Orford, 2004; Sabiston et al., 2007).

5.4.2.4 What was the end product of this research and how was it finally constructed?

All of the reviewed studies presented the major or core categories that emerged at the end of the analysis process. Results were presented as descriptive narrative summaries sometimes accompanied by a diagrammatical representation or model. Few studies presented evidence of theoretical density (i.e. subcategories and relationships had been comprehensively explored) (Chii et al., 2002, 2004). Most presented a predominantly descriptive account of the data they collected with little evidence to suggest conceptual depth (e.g. Bamber et al., 2003; Otter & Currie, 2004). Twelve (57%) studies provided no explanation as to exactly how the final results were decided (i.e. what final analytical decisions were made & on what grounds?). Four of the 21 (19%)

studies provided evidence to suggest that their studies achieved theoretical saturation (e.g. Bamber et al., 2000; Priest, 2007).

Table 5.3 Overview of Study Quality

Author(s) and Date of Publication	Was sampling conducted in accordance with the tenets of GTM?	How were the initial concepts and categories developed?	How did theoretical development continue after the initial concept identification?	What was the end product of this research and how was it finally constructed?
Lindgren & Fridlund (1999)	An appropriate sample was identified but not justified. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial concepts & categories were generated from the data but not presented. Line by line, open coding of the data was conducted to identify these raw themes (*).	A number of major categories were presented. Axial coding was employed with reference to the paradigm model to encourage theoretical density. Analysis progressed in a linear fashion.	Final categories were identified using selective coding, although this process was not described. Major categories are presented, providing a largely descriptive account of the data. Theoretical saturation is not referred to.
Bamber et al. (2000)	An appropriate sample was identified but not justified. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial text units or codes were created and placed into categories. This involved summarising lines of text. Memos were used throughout to provide an audit trail (*).	Theory development advanced by the continued identification of new text units and the categorisation of these.	Final categories were described when saturation had occurred (no new categories were emerging). These represent a largely descriptive account of the data.
Lindgren et al. (2000)	Sample was purposively selected. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial concepts & categories were generated from the data but not presented. This involved line by line coding to summarise the data (*).	Theory development advanced by using axial coding to develop each category further. The paradigm model was used to facilitate this. Analysis progressed in a linear fashion.	Final categories were identified using selective coding, although this process was not described. Major categories are presented, providing a largely descriptive account of the data. Theoretical saturation is not referred to.
Currie & Devlin (2002)	An appropriate sample was identified but not justified. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial concepts and categories were not presented but open coding was reportedly conducted on the data. This process is not described (*).	It is unclear how theory development advanced, other than stating that major themes were analysed according to GTM procedures.	Final categories are presented but it is unclear how they were finally selected. These represent a descriptive interpretation of the data. Theoretical saturation is not referred to.
Chitt et al. (2002)	An appropriate sample was identified but not justified. Simultaneous data collection & analysis occurred & emergent themes influenced the data collection (*).	Preliminary sub-categories were generated but not presented, using open coding techniques. This process is not described. Comparisons were made both within and between data sets (*).	Theory development advanced using continued comparisons and axial coding to develop a core category. The paradigm model is also referred to as a way of creating theoretical structure. These processes are not described (*).	A theoretical framework was generated and presented. It is unclear how this was finally determined. Theoretical saturation is not referred to (*).
Bamber et al., (2003)	An appropriate sample was identified but not justified. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial concepts and categories were generated from the data and presented. This involved open coding procedures. Memos relating to emergent themes were also recorded at this stage (**).	Theory development advanced by categorising or grouping initial themes into higher order themes.	Final categories are identified after further grouping of higher order themes. This occurred when theoretical saturation was reached. It is not clear how this was determined. Findings represent a largely descriptive account of the data.
Chitt et al. (2004)	Sample was purposively selected. Simultaneous data collection & analysis occurred & emergent themes influenced the data collection (**).	Preliminary subcategories were generated but not presented using open coding techniques. This process is not described (*).	Theory development advanced using axial coding to classify, analyse and compare subcategories. This process is not described. Analysis progressed in a linear fashion (*).	When categories became saturated a theoretical framework centred around a core category was generated and presented (*).

Author(s) and Date of Publication	Was sampling conducted in accordance with the tenets of GTM?	How were the initial concepts and categories developed?	How did theoretical development continue after the initial concept identification?	What was the end product of this research and how was it finally constructed?
Wenneberg et al. (2004)	Sample was purposively selected. Simultaneous data collection & analysis occurred & emergent themes influenced the data collection (**).	Initial concepts & categories were generated from the data but not presented. Coding at a "general" level was conducted to develop these (*).	Theory development advanced by using constant comparisons to develop & refine major categories. It is not clear how this was achieved.	Major categories were presented, but it is unclear how they were finally selected. These provided a largely descriptive account of the data. Theoretical saturation was not referred to.
Cox & Orford (2004)	An appropriate sample was identified but not justified. Simultaneous data collection & analysis occurred & emergent themes influenced the data collection (*).	Initial concepts & categories were generated from the data & presented. Open coding procedures including line by line coding & in vivo coding were conducted. Theoretical memos were also used extensively to encourage theoretical development (**).	Theory development advanced using focussed coding to develop the concepts & categories further. It is not clear how this was conducted but the constant comparative method was employed. Analysis did oscillate between open & more focussed coding (*).	Major categories are presented, but it is unclear how they were finally selected. These provide a largely descriptive account of the data. Theoretical saturation is not referred to.
Otter & Currie (2004)	Sample was purposively selected. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial concepts & categories were not presented & there was no evidence to suggest that such concepts & categories were developed.	Theory development was advanced using content analysis. No more information is provided.	Major categories are presented, but it is unclear how they were finally selected. These provide a largely descriptive account of the data. Theoretical saturation is not referred to.
Crone et al. (2005)	Sample was purposively selected. Simultaneous data collection & analysis occurred & emergent themes influenced the data collection (**).	Initial concepts & categories were not presented. However, open coding memo-writing & comparisons were mentioned but it is unclear how they were implemented (*).	Theory development was reportedly advanced using axial coding, selective coding, comparisons & memo writing. However, it is not clear how this occurred (*).	Major categories are presented, but it is unclear how they were finally selected. These provide a largely descriptive account of the data. Theoretical saturation is not referred to.
Concepcion & Ebbeck (2005)	An appropriate sample was identified but not justified. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial concepts & categories were not presented. However, initial analysis did involve coding. This process is not explained (*).	Theory development was advanced by comparing & refining initial codes. This process is not explained in any more detail.	Major categories are presented, but it is unclear how they were finally selected. These provide a largely descriptive account of the data. Theoretical saturation is not referred to.
Christensen et al. (2006)	Sample was purposively selected. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial concepts & categories were not presented. Open coding procedures were reportedly utilised, but this process was not described (*).	Theory development was reportedly advanced using axial coding & focussed coding procedures, although these were not described. Analysis progressed in a linear fashion.	A core category was selected as a result of axial & theoretical coding procedures. It is unclear what these procedures involved. Subcategories are also presented & described. Theoretical saturation is not referred to (*).
Lawton et al., (2006)	Sample was purposively selected. Simultaneous data collection & analysis occurred & emergent themes influenced the data collection (**).	Initial concepts and categories were generated but not presented. Apart from through discussions between researchers, it is not clear how these were developed.	Theory development was reportedly advanced by discussion emergent themes in later interviews and refining themes and concepts where necessary.	The end product of the research represents a descriptive interpretation of the data. Theoretical saturation is not referred to.
Whipple et al. (2006)	Sample was purposively selected. Simultaneous data collection & analysis occurred & emergent themes influenced the data collection (**).	Initial concepts & categories were generated from the data but not presented. Open coding was conducted on the data. This involved selecting sections of text that were deemed relevant (*).	Theory development advanced by exploring emergent themes in subsequent interviews. Axial coding was reportedly conducted to identify categories & subcategories. This process was not described (*).	Major categories are presented but it is unclear how they were finally selected. These provide a largely descriptive account of the data. Theoretical saturation is not referred to.

Author(s) and Date of Publication	Was sampling conducted in accordance with the tenets of GTM?	How were the initial concepts and categories developed?	How did theoretical development continue after the initial concept identification?	What was the end product of this research and how was it finally constructed?
Sabiston et al. (2007)	Sample was purposively selected. Due to practical constraints, simultaneous data collection & analysis did not occur but microanalysis was conducted between interviews, which did influence subsequent data collections.	Initial concepts & categories were generated from the data but not presented. Open coding was used to identify key actions & conceptions within the text. This involved attaching labels to segments of the data (*).	Theory development advanced using axial coding to explore the concepts & categories in more detail. Constant comparison, memo writing & modelling were used at this stage. Analysis did oscillate between open & more focussed coding (**).	Major categories are presented, but it is unclear how they were finally selected. These provide a largely descriptive account of the data. Theoretical saturation is not referred to.
Priest (2007)	An appropriate sample was identified but not justified. Simultaneous data collection & analysis occurred & emergent themes influenced the data collection (*).	Initial concepts & categories were generated from the data but not presented. This involved line by line coding & comparing & collapsing codes to form categories. Memo writing was also used to make theoretical & operational notes (*).	Theory development advanced when emergent themes were explored in subsequent interviews. As well as the techniques used during initial coding, models were also used at this stage. Analysis did oscillate between open & more advanced procedures (*).	A final model is presented when theoretical saturation occurred. This represents a largely descriptive account of the data. It is unclear what decisions led to the construction of the final model.
Burgoyne et al. (2008)	Sample was purposively selected. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial concepts & categories were generated from the data but not presented. Open coding was used to fracture the data into meaningful units (*).	Theory development reportedly advanced using axial & selective coding to assemble the fractured units into categories and uncover relationships between them. These processes were not described (*).	Major categories are presented but it is unclear how they were selected. These provide a largely descriptive account of the data. Theoretical saturation is not referred to.
Crone & Guy (2008)	Sample was purposively selected. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial concepts were generated by synthesising text units into themes. Open coding and comparisons were referred to but not described (*).	Theory development was reportedly advanced using axial coding and selective coding procedures. Memo's, theorising and the conditional matrix were all referred to but these processes were not described (*).	A conceptual framework is presented based on the paradigm model. It is unclear what decisions led to the development of this. Theoretical saturation is not referred to (*).
Giacobbi et al. (2008)	Sample was purposively selected. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial concepts and categories were generated from the data and presented, using open coding procedures (*). This involved labelling raw data themes.	Theory development advanced by conducting focussed coding. This involved sorting and grouping the most frequently mentioned raw themes. Constant comparisons facilitated this processes. Analysis progressed in a linear fashion.	Higher order categories were presented based on continued focussed coding and exploration of relevant literature. These provide a largely descriptive account of the data. Theoretical saturation is not referred to.
Groves et al. (2008)	An appropriate sample was identified but not justified. No evidence to support theoretical sampling or simultaneous involvement in data collection & analysis.	Initial concepts and categories were not presented and there was no evidence to suggest that such concepts and categories were developed.	There is no evidence of theory development other than describing potential links observed in the raw data. Comparisons between the data sets facilitated this process.	The end product of the research represents a descriptive interpretation of the data. No major categories are presented and theoretical saturation is not referred to.

* Judged as being potentially consistent with the key characteristics of GTM, but lacking in sufficient evidence.

** Judged as being consistent with the key characteristics of GTM, with supportive evidence.

5.5 Discussion

5.5.1 Summary of Findings

The results revealed that GTM is becoming increasingly popular within exercise psychology research. However, many of the reviewed studies demonstrate a poor understanding of GTM or fail to present an adequate account of the research process to allow for an accurate assessment of study quality to be made. This is evident since a number of potential misconceptions associated with GTM use were identified.

5.5.2 Implications for Research

First, GTM is often viewed solely as a data analysis tool (e.g. Lindgren et al., 2000; Wenneberg et al., 2004); whereby techniques associated with GTM are utilised only at the data analysis phase of the research. Charmaz (2006) explains that a GTM begins when the researcher identifies and enters the field where they aim to gather data. Strauss and Corbin (1990, 1998) also stress the importance of sampling strategies or data gathering decisions within GTM and explain that they should be dictated by the research problem and aimed at theory construction not simply population representativeness. Consequently, there are decisions that have to be made during a GTM based study that relate to data gathering as well as the data analysis. Secondly, 12 of the reviewed studies (57%) treated data collection and data analysis as separate phases in the research process. As explained previously, another common characteristic of GTM is that it is considered an iterative process (Johnston, Corban & Clarke, 1999), whereby the initial data collection and analysis informs subsequent data collections and analyses, a process referred to as theoretical sampling (Glaser & Strauss, 1967). Therefore, data collection and analysis in GTM need to occur concurrently in order to facilitate this process. Both these characteristics mentioned above are crucial to GTM, because they ensure that research findings are grounded in and emerge from relevant data and encourage in-depth exploration of emergent themes and concepts.

Clearly, it would seem inappropriate for researchers to utilise GTM solely as a data analysis tool, even if it is explicitly stated that they only intended to use certain GTM related techniques and never professed to be following a GTM based approach. Arguably if methods and techniques are 'cherry picked' in this way, then they are no longer GTM methods because they are not consistent with the essence of the methodology. Consequently, by adopting selective qualitative methods in this way, researchers risk their work being underpinned by an incongruous epistemological

position. By mixing different qualitative methods, there is greater potential for marrying techniques that arguably reflect opposing or contradictory epistemological positions. In addition, any studies that do claim to follow a GTM based approach and fail to engage in simultaneous data collection and analysis, are fundamentally flawed because they have failed to engage in theoretical sampling and ultimately acknowledge the iterative nature of GTM.

In order to facilitate sampling that is consistent with GTM, researchers are firstly encouraged to provide a sound justification for their initial sampling strategy. This should be included in the study methods because it allows readers to view the decision making process that led to the selection of the initial sample (purposive sampling). Secondly, memo writing can also be particularly useful for theoretical sampling. Charmaz (2006) explains that memos allow the researcher to keep a record of the analytical process. This includes emergent questions and ideas that the researcher may decide to follow up in subsequent data collections. Therefore, memos provide an important source of information about emergent themes or theoretical formulations that may need to be pursued in more detail (Bringer, Johnston & Brackenridge, 2006a). Results from the current review revealed that less than half of the reviewed studies reported using memos.

An important characteristic of GTM is its ability to move qualitative enquiry beyond descriptive studies, into the realm of explanatory theoretical frameworks (Glaser & Strauss, 1967; Glaser, 1978; Strauss, 1987). Strauss and Corbin (1998) explain that analysts should be looking for answers to questions such as why, where, when, how and with what results in order to encourage theoretical density. They explain that by answering such questions, analysts are able to relate structure (conditions) with process (actions & interactions). To achieve this, grounded theorists are encouraged to utilise a range of analytical procedures and techniques designed to facilitate the advancement of theory development during each step of data collection and analysis. These include, initial or open coding, focussed coding, axial coding and theoretical coding (Charmaz, 2006). Within these, techniques such as labelling, memo writing, asking questions, making constant comparisons, use of the paradigm model and modelling are commonly encouraged. While a researchers choice of which of these techniques to employ will depend on their epistemological and theoretical stance, there should still be clear evidence of progressive theoretical development, leading to theoretical or conceptual density in all GTM based studies.

The evaluation criteria, developed for this review (See Table 5.1), attempted to capture evidence of theoretical development by asking questions about the various procedures used throughout, and about the end product of the research process. This identified a number of methodological flaws. First, while most of the reviewed studies described a process of early concept identification (i.e. attaching descriptive labels to the data), many failed to present any evidence of a progression to more focussed analytical procedures. For example, some studies simply continued to use initial coding procedures throughout or referred to descriptive content analysis procedures (e.g. Bamber et al., 2000; Otter & Currie, 2004). Others described techniques such as axial coding and constant comparisons but failed to present any evidence of these procedures (e.g. Chii et al., 2002; Crone et al., 2005). Where limited evidence was presented to suggest progressive theoretical development, findings often represented descriptive accounts of the data collected as opposed to substantive explanatory models.

When Johnston et al. (1999) described GTM as an iterative process, this was also intended to stress that the progression from initial coding procedures to more focussed coding should not be reviewed as a linear process. Specifically, grounded theorists should always remain open to new possibilities emerging from the data (Charmaz, 2006). This is a strength of GTM because it encourages researchers to view all the data as potentially relevant. Despite this being a key characteristic of the data analysis process in GTM, very few of the reviewed studies presented evidence to suggest that their analyses continued to remain open to new possibilities after initial themes had been identified. While many described using open ended questioning throughout, there was little evidence that new emergent themes were considered once the analysis had started to develop.

It is commonly accepted that the end of any GTM based study occurs when theoretical saturation is achieved. This refers to a point when gathering fresh data no longer sparks new theoretical insights, nor reveals new properties or dimensions, that relate to the core theoretical categories (Strauss & Corbin, 1998). To achieve this researchers must first be conducting theoretical sampling. Results of this review revealed that only nine (43%) of the reviewed studies reported simultaneous involvement in data collection and analysis, and of those nine, only four studies referred to theoretical saturation. It is also worth noting that in order to evidence theoretical saturation, there must first be evidence of in-depth theoretical development (i.e. identification of the properties & dimensions of categories), and only one of those four (Chii et al., 2004) presented any evidence of this. Consequently, many of the grounded

theories presented in the reviewed papers may represent incomplete findings because the data was not explored in sufficient depth. To facilitate theoretical saturation member checking procedures are commonly endorsed, whereby emergent theoretical formulations are taken back to research participants for their confirmation (Charmaz, 2006). As explained in the introduction, a grounded theory should represent an explanatory model of the studied phenomenon grounded in relevant empirical data (Glaser & Strauss, 1967). To create such an explanatory model, it is commonly accepted that there must be evidence of theoretical density or depth to the observations presented (Charmaz, 2006; Corbin & Strauss, 2008; Glaser & Strauss, 1967). Therefore, the final results of the reviewed studies should present evidence of this by identifying and presenting core categories or higher order themes and then describing the various dimensions that relate to these. However, the results of the reviewed studies generally revealed descriptive summaries of the data collected, which lacked such theoretical density. A possible explanation for this is that many of the reviewed studies did not set out to produce explanatory models, but instead intended to create descriptive accounts of a particular concept or theme. In which case, GTM was an inappropriate methodology for the purposes of their research. Alternatively, studies may have failed to fully examine the emergent concepts by utilising appropriate advanced coding and questioning strategies, resulting in limited theoretical density.

5.5.3 Limitations

The evaluation criteria (See Table 5.1) used in the review was designed to elicit relevant information from each study, to stimulate discussion on the quality of GTM based research within exercise psychology. However, the extent to which this information was reported varied greatly across the reviewed studies, with many only reporting limited summaries of the methods employed, particularly for the analytical procedures (e.g. Crone & Guy 2008; Lawton et al., 2006). This in itself represents a potential limitation of the current review because its findings are based solely on information presented in the papers themselves. Thus, it is difficult to discern between whether GTM related processes were not followed or if the authors simply failed to report following them (i.e. absence of evidence does not equal evidence of absence *per se*). Consequently authors may have been limited by the manuscript submission criteria of journals and been forced to omit some methodological detail. While most publications specify word or page limits, it is crucial that these are able to accommodate the relevant information required for an adequate assessment of study quality. However,

rigid formulae do not exist for writing up GTM studies and as a result, authors and editors may be unsure what information is required to allow for an adequate assessment of GTM based research quality. It is generally agreed that when communicating the findings of qualitative work, transparency is essential (Bringer et al., 2004; Bringer, Johnston & Brackenridge, 2007). If authors are encouraged to present their GTM based research in a clear, detailed and transparent manner, then the assessment of the quality of this type of work can be enhanced.

To encourage greater transparency in GTM based research, future research may consider the role of CAQDAS packages. Previous research has demonstrated that CAQDAS can provide researchers with a means of presenting a more transparent account of the research process employed (Bringer et al., 2004; Johnston, 2006). Specifically, it is suggested that if used appropriately, CAQDAS can help manage the evolving GTM process. Further, it has also been suggested that CAQDAS can be used to facilitate certain aspects of GTM (Bringer et al., 2006a). For example, Bringer et al. (2006a) demonstrate how CAQDAS can facilitate the iterative process associated with GTM designs. However, in order to use CAQDAS appropriately, researchers must first be able to demonstrate a good understanding of the key characteristics of GTM.

5.6 Conclusions

The findings of this review raise a number of important implications for the both the methods employed in this thesis and the wider exercise psychology research community. In summary, GTM should represent a process of concentrated active involvement by the researcher (Charmaz, 2006), that centres around the data collected and its relationship to the studied phenomenon. To evidence this, researchers need to present a transparent account of all the procedures and decisions that take place. There should be evidence to suggest that initial sampling or data gathering is dictated by the research problem and that initial concepts and categories are developed from the data itself. These initial concepts and categories should be explored and further developed by asking appropriate questions of the existing data. Where necessary, changes in sampling, data collection strategies and specific questioning should also be made in order to obtain further insight from additional data. As the analysis develops the researcher should continue to remain open to new emergent possibilities and where necessary incorporate these into the analysis and/or emergent theory. To facilitate continued theoretical development, researchers are encouraged to use a range of techniques to ask appropriate questions of the data in order to help identify, dimensions and relationships associated

with the emergent themes and categories. Finally, the end of a GTM based study should reveal a substantive, explanatory theoretical model of the studied phenomenon and not just a descriptive account of the data collected. At this stage, there should be evidence of theoretical saturation to indicate that all theoretical possibilities were appropriately explored.

Although this review focuses exclusively on GTM based research undertaken in exercise psychology, its implications have relevance whenever GTM is adopted. Specifically, the criteria presented in the methods section highlights characteristics which should be evident in all applications of the methodology. Therefore, in order to encourage greater rigour in GTM based research designs and further legitimise it as a form of enquiry within exercise psychology, it is crucial that both authors and reviewers of future research understand the key tenets of this approach and the limitations associated with many previous studies. Research rigour in GTM can only be judged if authors present a clear and detailed account of their research process. In addition to this, researchers must recognise that GTM, regardless of the interpretation adopted, represents a complete research process where appropriate actions need to be considered at every stage from the problem identification and initial sampling phases, through to the theoretical refinement and presentation of the research findings. As explained previously, for the purposes of this thesis, the findings of this review represent valuable implications for practice, which have influenced the GTM process reported in subsequent chapters of this thesis. Specifically, the implications mentioned in the discussion were used to ensure that the methods and procedures followed throughout remained consistent with the fundamental tenets of GTM and the constructivist position that has been assumed. Finally, it is important to stress that the intention of this review was not to undermine the epistemological debates within GTM but to help researchers to work within a GTM framework regardless of their epistemological and theoretical stance.

Chapter 6: Methods, Procedures and Analytical Strategy

6.1 Introduction

As explained in Chapter 4, this thesis adopts GTM to gain a better understanding of the processes and mechanisms involved in successful PA behaviour change. Based on the evidence presented in Chapter 5, it is clear that any GTM based study should represent an iterative process of concentrated, active involvement by the researcher, that centres around the data collected and its relationship to the studied phenomenon. In addition, research rigour in GTM can only be judged if authors present a clear and detailed account of the research process. Figure 6.1 summarises the entire iterative GTM process that led to the development of the final grounded theory, presented in Chapter 8 of this thesis. The purpose of the present chapter is to present a detailed description of the methods and procedures used throughout this process. It also provides a detailed justification for their inclusion, explaining how they fit with both the current research question and a GTM based approach.

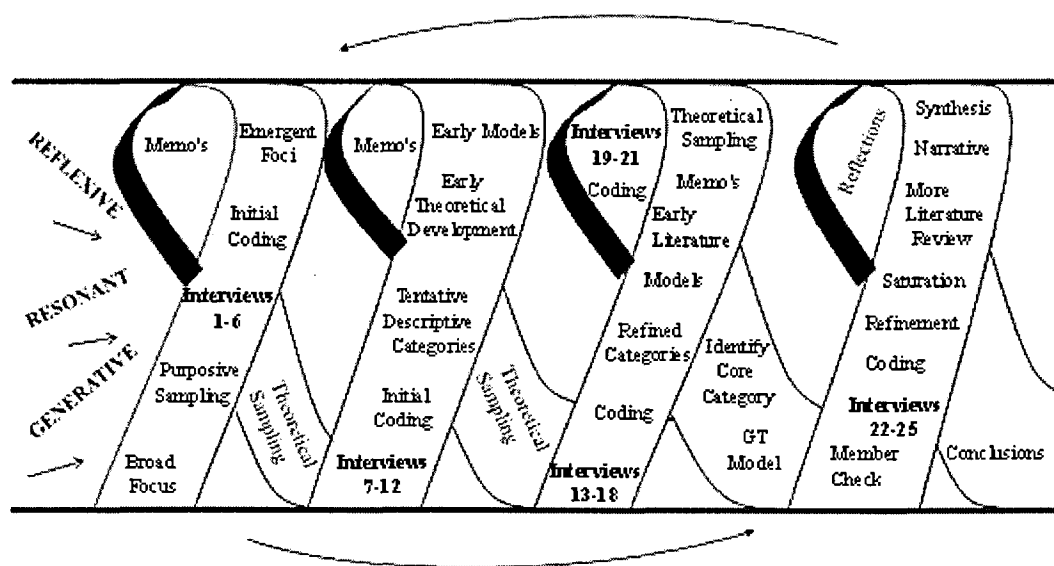


Figure 6.1 Overview of the Iterative GTM Process for the Present Study (adapted from Johnston, et al., 1999, p. 268).

6.2 Participants and Sampling Strategy

Charmaz (2006) explains that a GTM *adventure* starts when the researcher enters the field where they intend to gather data. Data are the records of what is being studied. The researcher makes data by selecting and using them as evidence in an

analysis (Richards, 2005). Data can be derived from a wide range of sources, such as interviews with participants, research papers and observations. Glaser and Strauss (1967) explain that different types of data provide different views or vantage points from which to develop, or in this case construct, understanding. Richards (2005) explains that what is required is a body of data from which an adequate answer to the research question can be derived. As explained in Chapter 5, a key characteristic of GTM is sampling aimed at facilitating theory generation. Specifically, sampling strategies or data gathering decisions should be dictated by the research problem and aimed at theory construction, not simply population representativeness (Corbin & Strauss, 2008).

As a result, both purposive and theoretical sampling procedures were adopted in this study. Coyne (1997) distinguishes between purposive and theoretical sampling and highlights that they are often wrongly used synonymously in the literature. Cutcliffe (2000) explains that the difference between these two types of sampling is that purposive sampling involves the calculated decision to sample a specific locale according to a preconceived but reasonable set of dimensions, whereas theoretical sampling has no such initial calculated decisions. Instead, theoretical sampling refers to seeking pertinent data to develop the emerging theory by elaborating and refining emergent concepts and categories (Charmaz, 2006). Therefore, although theoretical sampling represents an important component of GTM designs, in order to commence this process, purposive sampling must be employed to identify an initial data source from which theoretical sampling can then occur. In the current study, the initial sample was purposively selected on the grounds that the data needed to provide insights into how people successfully change PA related behaviours. Thereafter, subsequent data collection procedures were dictated by the concepts and themes that emerged from previous data (Strauss & Corbin, 1998). Consequently, to ensure that sampling was aimed at theory generation, the methods employed to examine the current research question were dictated not only by the research question but also by the data as specific themes and concepts emerged.

6.2.2 Participants

To obtain rich data concerning the processes involved in PA behaviour change, individuals with experiences of change in this context represent an important data source. As explained in Chapter 2, PARS aim to increase opportunities for PA by providing people with access to exercise facilities, activities and advice (Morgan, 2005). In order to examine how people successfully change their PA related behaviour, an

appropriate initial sample and setting for this investigation was identified as people who have previously completed PARS programmes, and are maintaining increased PA participation. However, this is problematic in itself because the term maintenance, when applied to behavioural changes, can be difficult to define. For example, in smoking cessation successful maintenance is defined as a complete abstinence from smoking for a minimum of six months and termination of that successful change can be assumed after approximately five years (Velicer, Prochaska, Rossi & Snow 1992). Clearly a similar definition cannot be applied to PA because as a behavioural state it is highly variable in nature (i.e. the degree to which people have altered their PA habits varies from one person to the next). Therefore, for the purposes of participant recruitment for this study, maintenance was viewed as a process of continued participation in PA at a level consistent with that which was desired or prescribed (by a medical professional) prior to any changes occurring. However, in order to obtain information relevant to long-term change, participants were only recruited for this study if they had been maintaining their behavioural changes for a minimum of five years.

Within clinical referral settings, the initial referral to leisure providers is by external agencies (i.e. by the health professional). By understanding behaviour change in this context, compared to change that is predominantly initially internally regulated, the results should lead to more powerful applied implications because the majority of interventions need to target people who are not intrinsically motivated to change from the outset (NICE, 2006). It also seems more appropriate to target an adult population because PARS are usually aimed at adults, and research evidence has identified that the motives and incentives of children and adolescents for PA participation can differ from those of adults (e.g. Gill & Overdorf, 1994; Sallis et al., 2000). Therefore, by targeting an adult population, the applied implications should be highly relevant to a large clinical population, where there is a proven need for better targeted interventions (See Chapters 1 & 2).

Due to the exploratory nature of GTM and the fact that sampling decisions should be aimed at theory generation (Corbin & Strauss, 2008), the initial sample were broadly selected on the grounds that they should provide insight into the research question. In line with the principles of theoretical sampling, subsequent sampling decisions were then influenced by the emergent findings. Consequently, with institutional and NHS ethics approval (Section 4 of this chapter), a total of 21 adult participants (9 male, 12 female), aged between 38 and 62 years (mean age = 49.8 years), were ultimately recruited from a countywide PARS database to take part in this study.

Initially, contact was made with a number of representatives from Sheffield based referral schemes regarding the recruitment of potential participants. Unfortunately, all of the local schemes were relatively new, which limited the potential to recruit long-term maintainers. Because sampling should be aimed at facilitating theory generation (Charmaz, 2006; Corbin & Strauss, 2008; Glaser & Strauss, 1967) and the primary research objective of this thesis was to further develop theoretical understandings of successful *long-term* PA behaviour change, it was decided that these local schemes did not meet the sampling requirements of this study. As a result, a scheme based in Somerset which had been running for nearly 10 years (ProActive) was selected as an appropriate initial data source.

All participants recruited had completed the scheme at least five years prior to the start of the recruitment process (July 2007) and were continuing to maintain regular PA participation (See definition above) while meeting the DH recommendations³. Therefore, all participants shared the common characteristic that they had made significant changes to their lifestyle PA habits and were maintaining those changes. Table 6.1 presents an overview of each participants characteristics and their involvement in the study.

³ The DH recommend a total of a least 30 minutes a day of least moderate intensity PA, on five or more days of the week, to reduce the risk of cardiovascular disease, some cancers, type II diabetes and to improve psychological wellbeing (DH, 2004).

Table 6.1 Participant Details

Interviewee Number	Age	Sex	Years Maintaining	Physical Activity Levels ^a			Date of Interview	Duration (Minutes)	Follow Up Interview
				Vigorous	Moderate	Light			
1	62	F	7	4	6	7	17/09/07	52	22/08/08 (54mins)
2	59	F	7	4	8	4	20/09/07	85	29/09/08 (54mins)
3	45	F	7	6	4	5	12/10/07	52	No
4	41	F	7	7	7	7	30/10/07	60	No
5	42	M	7	4	6	6	8/11/07	63	No
6	42	M	6	4	6	7	12/11/07	79	No
7	58	F	7	6	7	7	9/01/08	96	13/10/08 (47mins)
8	38	F	6	4	6	5	17/01/08	60	17/10/08 (35mins)
9	46	M	5	8	10	14	12/02/08	56	No
10	57	M	6	4	5	6	15/02/08	47	No
11	45	F	6	4	6	5	03/03/08	50	No
12	61	M	6	4	6	6	10/03/08	43	No
13	56	M	7	2	8	6	27/06/08	45	No
14	62	F	6	4	5	7	15/07/08	46	No
15	58	F	6	4	5	6	18/07/08	35	No
16	41	M	6	10	6	8	14/08/08	41	No
17	47	F	6	3	5	6	11/11/08	39	No
18	53	F	6	6	7	7	7/03/09	56	No
19	57	M	6	2	7	15	12/03/09	30	No
20	55	F	6	2	7	10	10/03/09	28	No
21	62	M	6	2	7	9	17/03/09	47	No

a. Physical activity levels are those reported in the pre-interview questionnaire (See Appendix A). The figures represent the amount of time each participant reportedly took part in vigorous, moderate or light PA, for more than 15 minutes, each week.

6.2.3 The ProActive Physical Activity Referral Scheme

The ProActive PARS is a collaborative countrywide scheme designed to provide a safe introduction to PA for people with a range of physical and mental health problems. It was established in 1994 and is run by the Somerset Physical Activity Group (SPAG) and Taunton Dean Primary Care Trust, with exercise sciences support assistance from Sheffield Hallam University (2005-2006) and the University of Gloucestershire (2000-2004). Since 2006, SPAG has divided the management of the

scheme between representatives from each of the district councils within Somerset.

ProActive involves the referral of primary care patients by health professionals to attend a programme of supervised exercise sessions with local leisure providers (e.g. leisure centres or health clubs). The scheme was evaluated positively between 1995 and 1997 (Grant, Harrison & Coe, 1999), which resulted in continued financial support and a number of modifications being made. Specifically, the Central Referral Mechanism (CRM) and the ProActive Management Service (PMS) were introduced. The CRM is a central database designed to keep a record of all people referred to ProActive, regardless of whether they take up referral or not. This was managed by the PMS, which represents an exercise science support service designed to bridge the divide between health professionals, patients and leisure providers, by recognising and addressing the needs of all these parties (Crone et al., 2004). This process involved coordinating each referral by making contact with each client and negotiating with the client to identify which specific leisure provider would best meet their needs based on a number of key variables such as cost, preferred type of activities, availability and timing of sessions, location etc. For each referral an attendance record was kept throughout, and where individuals successfully completed the scheme, a six month follow-up questionnaire was sent out to ascertain whether they were still physically active (See Appendix A). The CRM database represented a valuable data source for this study because it potentially provided access to individuals who had made long-term changes to their PA habits. Since the introduction of the PMS, the scheme has been widely evaluated over the years and has been recognised as an example of good PARS practice (Gidlow et al., 2005; 2007; Johnston et al., 2005).

6.2.4 Method of Data Collection

Having identified appropriate settings, sources of data and a sampling strategy, it was necessary to consider what type of data needed to be collected and how this would be achieved. Charmaz (2006) advocates gathering rich-detailed, focussed and full-data. She explains that rich data should reveal a range of information about participants such as; views, feelings, intentions and actions as well as the contexts and structures of their lives. Therefore, the data collection methods employed in this investigation needed to accurately identify the experiences and views of individuals who have successfully modified their PA habits.

The method of data collection selected for this investigation was in-depth interviewing. Interviews were chosen over other potential methods, such as

questionnaires or focus groups, because they represent the most effective and flexible way of obtaining detailed, in-depth information about PA behaviour change from those involved. Robson (2002) explains, that "the human use of language is fascinating both as a behaviour in its own right, and for the virtually unique window that it opens on what lies behind our actions" (p. 272). Interviews can explore areas of broad cultural consensus as well as peoples more personal or individual understandings (Arksey & Knight, 1999). Understanding how people change their PA related behaviours involves exploring both the cognitive and behavioural processes that people personally experience and the potential interplay that occurs between these. Therefore, interviews are particularly suited to gathering this type of information because if used appropriately, they can facilitate detailed discussions regarding both personal cognitions and their relationship with previous experiences and behavioural actions.

Kvale and Brinkmann (2009) identify a number of different types of interviewing, explaining their suitability for different research purposes. These include focus group interviews, factual interviews, conceptual interviews, narrative interviews and discursive interviews. They explain that different forms of interviewing represent a range of research tools, which can be adopted depending on the purpose of the enquiry, the type of knowledge sought, the subjects of interest and the skills of the researcher. Due to the open ended, exploratory characteristics of the present research question and the iterative nature of GTM, it was inappropriate to identify a specific type of interview from the outset. However ultimately, the interviews conducted incorporated a range of the styles highlighted above. For example, to elicit detailed accounts of individual PA behaviour change experiences, elements of a narrative approach were required (e.g. "Please describe your experiences of the ProActive referral scheme"). In addition to this, as potentially relevant concepts emerged from the data, the interview often sought to obtain conceptual clarification and therefore could be described as adopting a conceptual approach (Kvale & Brinkmann, 2009).

Despite the need to adopt a flexible approach to the interview style, as explained above, one characteristic remained consistent throughout. That was the open-ended, relatively unstructured nature of the interviews conducted. In others words the interviews were non-directive to allow for emergent individual understandings and experiences to dictate the nature of further sampling and analytical procedures. This style of interviewing is often referred to as in-depth interviewing, because of its ability to permit in-depth exploration of interview themes (Robson, 2002). In-depth interviews are particularly compatible with GTM based research because not only do they offer a

flexible framework, which allows for questioning designed to explore emergent concepts and categories, but they also allow for immediate clarification and further exploration of responses (Arksey & Knight, 1999). For further details and justification for the interview content, see section 3.2 of this chapter.

So far this chapter has identified the most appropriate data sources and methods, based on their ability to accurately address the current research question. However, in any GTM based investigation, the emergent themes and categories generated by previous data collections and analyses influence future sampling decisions (theoretical sampling). Therefore, in order to demonstrate how this process occurred, the remainder of this chapter will describe in detail, the specific procedures involved in both the data collection and analysis of this GTM based investigation. In acknowledgement of the constructivist stance that has been adopted in this thesis (See Chapter 4), the first-person pronoun is used at times to refer directly to the author where appropriate.

6.3 Sampling Procedures

6.3.1 Participant Recruitment

All participants were recruited on a volunteer basis. Potential participants were identified from the CRM database. This process involved searching for all ProActive referrals who had both completed the scheme (at least 5 years prior to July 2007) and had indicated that they were still physically active and meeting DH recommendations, six months post-scheme. The CRM database revealed that there were 3153 referrals prior to July 2003 and of those, 257 met the above inclusion criteria. Therefore, a pool of 257 potential participants was identified from the CRM database.

A key characteristic of GTM is simultaneous involvement in the data collection and analysis phases of the research, in order to allow for the emergent themes and questions to influence subsequent sampling. Therefore, although 25 interviews were conducted in total, the recruitment process, interviews and subsequent analyses were spread out over the duration of the study. Therefore after an initial set of interviews had been conducted, all subsequent sampling and data gathering decisions were dictated by the emergent themes and questions generated by previous analytical procedures (See Section 6 for further details on how subsequent sampling decisions were made). The study lasted 22 months from when initial contact was made with potential participants, through to the completed development of the final explanatory model (Figures 6.1 & 6.2 present an overview of the data collection & analysis process). Some participants were

also interviewed on more than one occasion to facilitate theoretical sampling, by allowing for clarification or further exploration of emergent concepts to be sought from previous participants where appropriate.

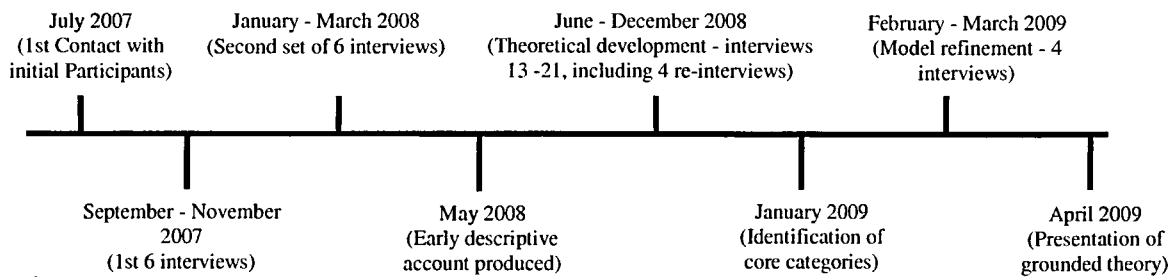


Figure 6.2 Study Timeline

The first contact with potential interviewees was via telephone in order to ascertain whether they would be interested in taking part in the research and if they still considered themselves to be regularly physically active. Database participants were selected and telephoned in chronological order from the oldest referrals to the most recent. This was to encourage the recruitment of participants who had been maintaining their behavioural changes for the maximum amount of time possible. On occasions some telephone numbers were no longer active or participants had moved house. In such instances, these people were excluded as potential participants. Where potential participants expressed an interest in participating in the research and professed to still be regularly physically active, they were sent further information by post. This included a formal letter inviting them to take part (See Appendix B), a participant information sheet (See Appendix C), an informed consent form (See Appendix D) a short PA questionnaire (See Appendix A) and a stamp addressed envelope for return of the consent form and PA questionnaire. Participant information sheets ensured that all participants were well informed by explaining the nature and purpose of the study. They contained details regarding the procedures involved from data collection through to data storage and analysis. Participants were also informed that they may be asked to participate in follow up interviews and were provided with the contact details of the principal researcher if participants needed to ask any more questions. Where potential participants consented to take part in the study and were still regularly participating in PA, in line with DH guidelines, then they were re-contacted by phone to arrange a telephone interview. For an overview of the participant selection process see Figure 6.3.

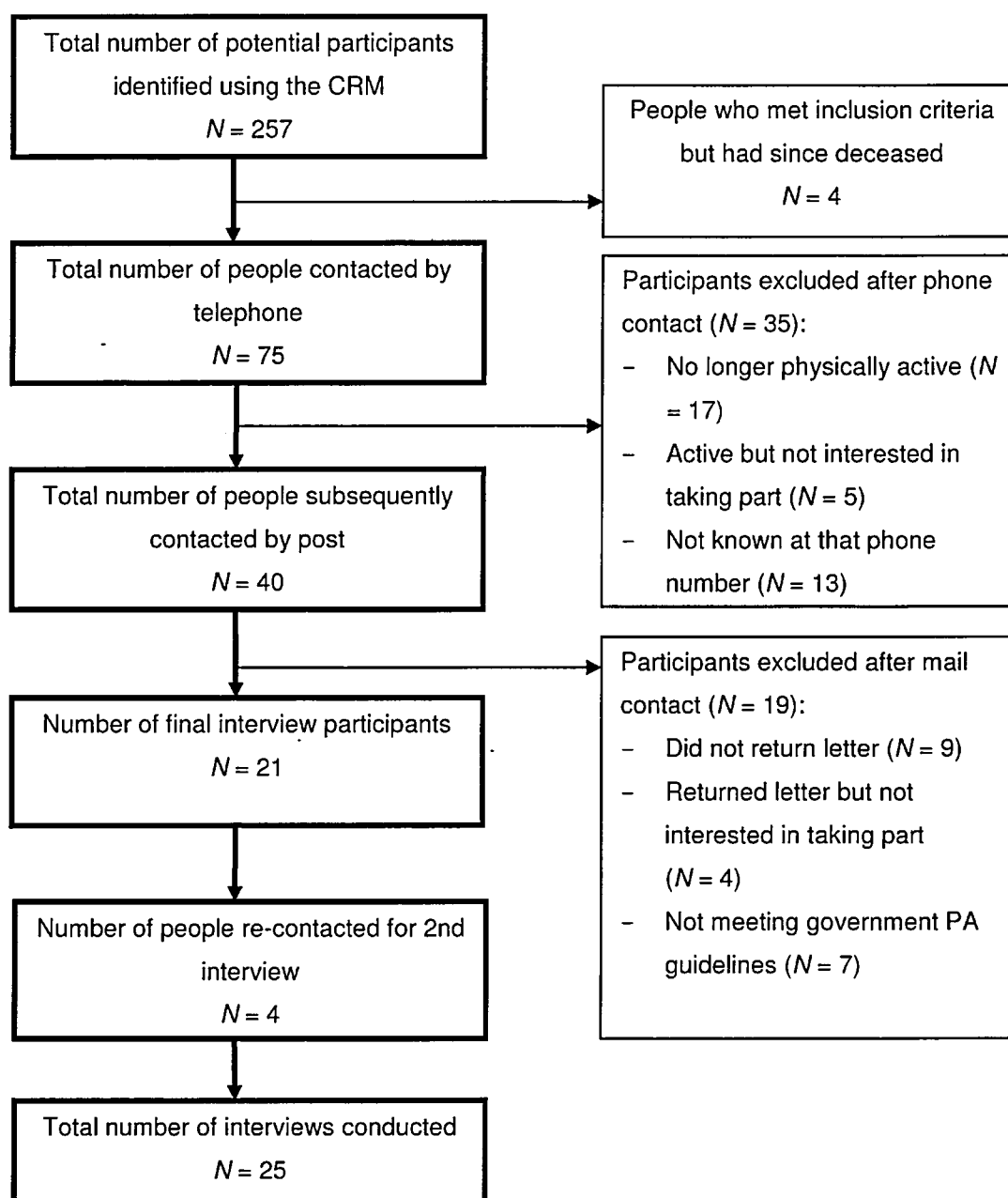


Figure 6.3 Participant Selection Process

6.3.2 Sample Size

My previous research training had always taught me the importance of sampling for population representativeness. When working with probability statistics, it is generally accepted that the larger the sample, the more accurately it will represent the population (Vincent, 2005). Because of this, despite reassurance from my supervisory team, I often worried about my seemingly small sample size. As explained in Chapter 5, theoretical sampling is a key characteristic of GTM, whereby all sampling is directed a

theory development and data should be rich, substantial, and relevant (Charmaz, 2006). Because I was interested in understanding a specific phenomenon or process (i.e. successful, long-term PA behaviour change), it was of primary importance for me to select a sample that represented that process. Due to the fact that all participants came from one single referral scheme (ProActive), it could be argued that they only represent a limited perspective of that process. However, as my analysis developed I soon realised that the referral scheme was relatively insignificant and provided little more than a starting infrastructure and a means of gaining access to people who may be demonstrating long-term change. Consequently, I am confident that the final sample generated a diverse range of detailed descriptions regarding the relevant views and actions of multiple participants. This allowed for a wide range of comparisons to be made in order to encourage in-depth exploration of the emergent concepts and categories and ultimately a thorough exploration of the PA behaviour change process.

If deliberate attempts had been made to obtain a larger sample and subsequently conduct a greater number of interviews, I feel that this may have had a detrimental effect on the explanatory quality (and usefulness) of the final model. The GTM is intended to encourage the development of 'substantive' theory grounded in relevant empirical data (Glaser & Strauss, 1967). As explained in Chapter 5, this is achieved through in-depth exploration of the emergent data themes. Therefore, to ensure that the research conducted in this thesis accurately reflects this, considerable efforts were made to ensure that the emergent data was explored and responded to appropriately, and decisions to conduct further sampling occurred to facilitate this process. Consequently, while the results presented Chapters 7 and 8 represent a unique insight into the PA behaviour change process, the participants' responses presented in this thesis are not necessarily generalisable to the wider population. While the model presented in chapter 8 is empirically grounded, it requires further testing before wider claims relating to causality can be made.

6.3.3 Interviews

Due to the location of the ProActive scheme (Somerset), a number of practical challenges emerged. Specifically, in order to conduct face-to-face interviews it would have been necessary to travel down to Somerset for each interview (approximately a 460 mile round trip). Additionally, interviews would have probably had to be conducted in people's homes due to the fact that participants were likely to be spread throughout Somerset. Consequently, in order to ensure an appropriate theory generating sample (i.e.

long-term maintainers), I felt I had to compromise my data gathering approach slightly, by conducting all interviews over the telephone. On reflection, I don't feel that these sampling decisions had a detrimental effect on this study because at no point during the GTM process was it judged necessary to sample outside of the ProActive database, to advance theory development. In addition, most interviewees were very forthcoming during the telephone interviews. Arksey and Knight (1999) highlight the importance of conducting interviews in an environment that makes the respondent feel comfortable. By conducting interviews over the telephone, participants were allowed to remain in their home environment and had the obvious advantage of overcoming any problems associated with sampling from a number of different geographical locations, such as travelling time and costs. A number of researchers have questioned the appropriateness of telephone interviews compared to face to face interviews (e.g. Donovan, Holman, Corti & Jalleh, 1997). Specifically, it has been suggested that important aspects of the interviewer/interviewee relationship, such as visual cues, can be lost. Despite this, research evidence has demonstrated that telephone interviews are comparable to face to face interviews in a number of health behaviour related research settings including, substance abuse (Greenfield, Midanik & Rogers, 2000), dietary assessment (Lyu et al., 1998) and the assessment of psychological health (Rohde, Lewinson & Seeley, 1997).

Due to the open ended nature of the interviews, interview lengths ranged from 28 minutes to 1 hour, 36 minutes. Table 6.1 details the interview date and duration of each interview. Each interview was tape recorded in order to retain a record of the whole conversation verbatim. All recordings were transcribed within 48 hours of the interview taking place in order to allow for subsequent analysis of the interview data (See Section 5 of this chapter for details of the analytical procedures). An advantage of tape recording the interviews is that it enables the interviewer to concentrate more on what was being said without having to make notes (Arksey & Knight, 1999). As a result it was easier to reflect and respond appropriately to the participant's answers. Also, by subsequently analysing a verbatim record of each interview, it ensured that the emergent theorising remained close to the actual data collected. All interviews were recorded using an Olympus DS-2300 digital voice recorder, transcribed into MS Word and then imported into the software package QSR NVivo 8 for data analysis (See section 5 for details on how QSR-NVivo was used).

6.3.3.1 Interview Content

In-depth interviewing refers to a directed conversation (Lofland & Lofland, 1995) that permits a detailed exploration of the participant's experience. During the interview process the interviewer seeks to understand the topic through the interviewee, who has the relevant experiences to shed light on it (Charmaz, 2006). Interview questions were designed to elicit as much information as possible regarding the processes of PA behaviour change and the factors and determinants that contribute to the change process. To conduct unstructured or in-depth interviews effectively, the researcher will typically decide only in general terms upon the main themes and topic areas to be explored (Arksey & Knight, 1999). This type of approach fits particularly well with GTM where it is important to enter the field of research with an open mind and minimal pre-conceptions (Buckley & Waring, 2005). For the purposes of this study, no clear agenda or list of questions was set out, instead some general open-ended questions/areas of interest were identified. These provided a framework from which respondents experiences could be explored (See Figure 6.4 for interview framework).

Due to the exploratory nature of GTM, it would have been inappropriate to identify a list of pre-determined questions for each interview. Charmaz (2006) explains that GTM interview questions should be open ended but directive. Therefore, based initially on the framework identified in Figure 6.4, an open ended questioning approach was adopted to explore those areas of interest. Memon and Bull (2000) explain that open-ended questions invite respondents to describe their situation or relate a narrative, and as a result tend to produce more expansive responses. However, in acknowledgment of the constructivist perspective that has informed this GTM based study, the interview process was viewed as an active, interpretive practice between respondents and the interviewer (Holstein & Gubrium, 2004), whereby both parties are implicated in the meaning making process. Therefore, in order to allow for sampling aimed at theory generation, the specific questions asked were informed and influenced by both responses to earlier questions and the emergent understanding from previous interview data. Therefore, while figure 6.4 represented a suitable guide for the early interviews, as specific themes and concepts began to emerge, questions became more directive to allow for further exploration of these where necessary (See Chapter 7 for a detailed description of how the analysis developed).

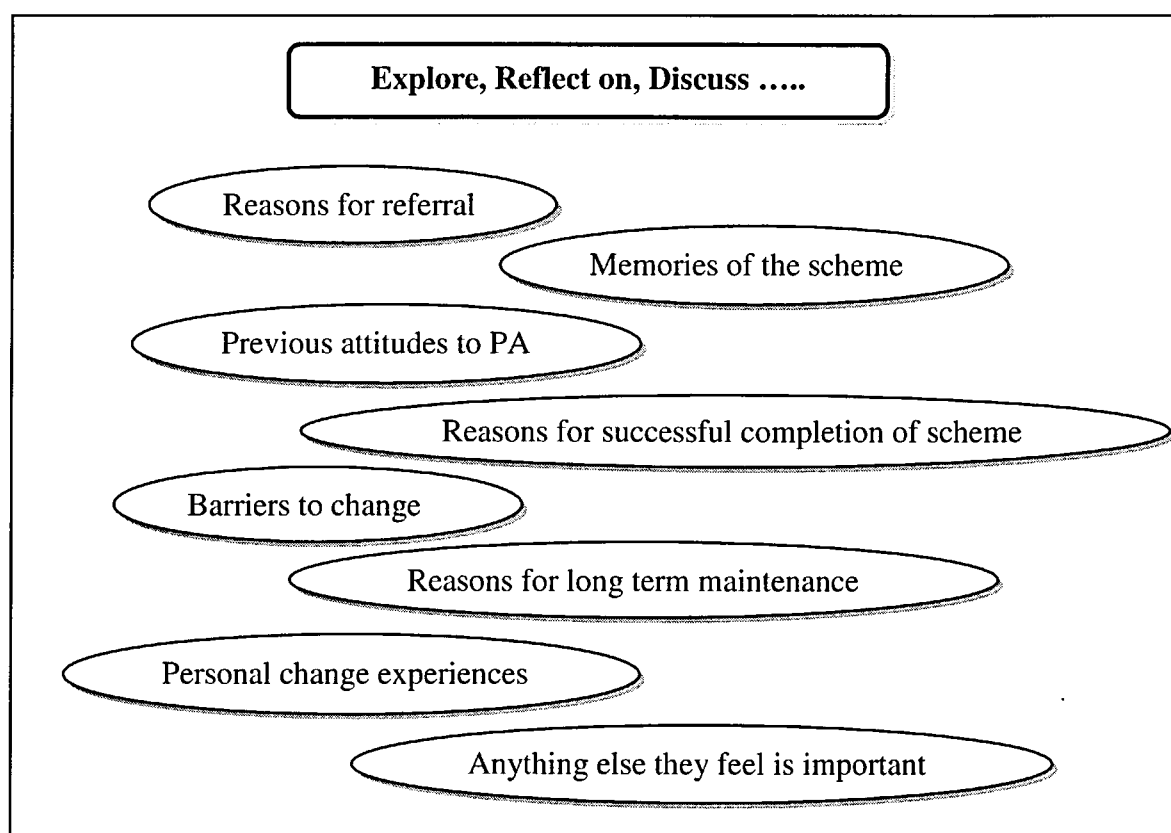


Figure 6.4 Initial In-depth Interview Framework

All interviews were conducted by the principal researcher and author of this thesis. In preparation for an interview Memon and Bull (2000) suggest that investigators need to consider strategies which are likely to increase their ability to establish rapport. Rogers (1951) advocates that interviewers develop the ability to be alert, interested, relaxed, warm, empathetic and genuine. The ability to listen carefully is an essential skill associated with good interviewing technique and it needs to be conceptualised as an active rather than passive process (e.g. Memon & Bull, 2000). Consequently, before conducting any interviews, the principle researcher was trained in reflective listening and qualitative interviewing techniques and certified competent by a member of the supervisory team [Dr L. Johnston; an experienced qualitative researcher and trainer in communication skills (i.e. member of the Motivational Interviewing Network of Trainers), chartered sport and exercise psychologist, and trained clinical psychologist].

6.4 Ethics and Risk Assessment

Due to fact that participants were being recruited from the ProActive referral schemes database and this research was conducted as part of an academic award, ethical approval was sought from both the University of Sheffield via independent scientific review (ISR) and the National Health Service (NHS) central office for research ethics

committee (COREC). National Health Service COREC approval is required when research involves NHS patients or data. Due to the fact that ProActive is a service provided by the Somerset primary care trust, NHS ethics procedures had to be followed. Independent scientific review approval was obtained on 13th November 2006 from Sheffield Hallam University and COREC approval was received on 6th March 2007 (See Appendix E). The following section outlines the main ethical issues associated with this study design.

6.4.1 Confidentiality and Anonymity

To ensure confidentiality and anonymity, participants were assigned an interviewee number, so that their real names were not attached to any of interview transcripts and subsequent findings from this study. The only documentation to contain participant details were the consent forms, which were stored in a secure location. The principal researcher had sole access to the interview transcripts, although extracts from them were viewed by the supervisory team to obtain feedback during the data collection and analysis phases of the study. All data was transcribed from audiotape format onto a computer into MS word format, where it was password protected. Digital voice recordings were also kept on file and password protected. There is no record of the participants' names on any of the interview transcripts.

6.4.2 Risk Identification

Participation in this study involved taking part in unstructured in-depth telephone interviews regarding PA behaviour change. As a result there were no anticipated physical risks to any of the participants involved. However, measures were implemented to ensure that the privacy and dignity of the participants was maintained at all times. Specifically, there was the potential for emotional risk if participants chose to talk about sensitive issues relating to their PA behaviour change. Arksey and Knight (1999) suggest that undue intrusion into private and personal spheres can cause embarrassment, distress and nervous strain. In order to minimise psychological distress, I received advice on how to deal with such situations from a member of the supervisory team (Dr L. Johnston), who was able to offer a clinical psychology perspective and ongoing supervision. All participants were also reassured that any potentially sensitive information would remain confidential and that the nature of their answers was entirely under their own control. Due to the fact that potential participants had also completed the scheme at least four years prior to the start of this study, there was a reasonable

chance that some of them may have since died. In order to avoid any unnecessary psychological distress to friends and/or relatives, a check was conducted by Somerset Primary Care Trust to identify any previous ProActive clients who had since deceased. These were then omitted as potential participants (See Appendix F for a risk assessment form).

6.5 Computer Assisted Qualitative Data Analysis Software (CAQDAS)

Advances in computer technology have led to the development of a range of software packages designed to assist with the analysis of qualitative data. This in turn fuelled extensive debate about the impact of software on method (e.g. Hutchison, Johnston & Breckon, 2008a; Johnston, 2006; Richards, 1998; Richards & Richards, 1995; Weitzman, 2000). For example, it has been suggested that CAQDAS has the potential to turn qualitative research into a rigid automated process that neglects the role of human interpretation and reflection (Kelle, 1995). Further concern has been voiced that computer analysis programmes allow users to do complicated analyses without fully understanding the principles of the techniques they are applying (e.g. Johnston, 2006; Richards, 1998; Weitzman, 2000). However, if the capacity of computers for recording, sorting, matching and linking is harnessed, then the efficiency of the data analysis processes can be greatly enhanced (Bazeley, 2007). Consequently, it is generally accepted that CAQDAS can enhance the data handling/analysis process *if* used appropriately (Bringer et al., 2004; 2006a 2006b; Johnston, 2006). However, the use of computers is not intended to replace the ways people learn from data, but to increase the effectiveness of such learning (Bazeley, 2007). Richards (2002) also explains that researchers should not attempt to fit their research to a particular software package, but to make the software work for their project.

6.5.1 CAQDAS and GTM

Bringer et al. (2006a) have demonstrated that CAQDAS can be used successfully to facilitate a GTM investigation. They explained that the software package QSR-NVivo (Version 1) helped the analysis move beyond thick description of the studied phenomena, to an explanatory model grounded in the data. QSR NVivo is a software package designed to provide users with a set of tools to assist with the analysis of qualitative data (Bazeley, 2007). Bringer et al. (2006a) demonstrated that NVivo can facilitate many aspects of the iterative process associated with GTM, and can help provide a transparent account of this, which should ultimately enhance study validity

(Bringer et al. 2004). Similarly, di Gregorio (2003) describes how the various functions of NVivo relate to different GTM processes. However, the processes described in her paper reflect a more objectivist stance, which is unlikely to be congruent with all researchers underlying ideologies. In order to demonstrate how CAQDAS can assist with GTM based research, it is important to acknowledge all the different interpretations of the methodology and subsequent choices that researchers may be presented with.

A limitation with Bringer et al's (2006a) paper is that although GTM is described as iterative, the authors failed to demonstrate how all the different techniques and processes they described linked together to contribute to an emergent theory. In order to capture this ongoing theory building process, it is important that the techniques are presented in a logical manner, to enable the reader to follow the analytical process. In addition, Bringer et al. (2006a) refer to the paradigm model as a heuristic tool to assist with theoretical development, but fail to demonstrate how NVivo or CAQDAS may facilitate its use. Further, both di Gregorio's (2003) and Bringer et al's (2006a) papers were also based on much earlier versions of NVivo.

To facilitate the development of this grounded theory of successful long-term PA behaviour change, NVivo (Version 8) was used throughout. Originally, this decision was centred on the organisational benefits that CAQDAS can provide. However it soon became apparent, that if used appropriately, NVivo could help facilitate many of the key characteristics of a GTM approach. Therefore, in describing the analytical and theoretical sampling related procedures, the remainder of this chapter further demonstrates how NVivo can be used to facilitate a GTM based approach.

6.6 Analytical Techniques and Theoretical Sampling Procedures

As explained in the previous Chapter, in GTM based studies, data collection is not a process separate from data analysis. Consequently, GTM is often referred to as an iterative process (Johnston et al., 1999), whereby earlier data collection and analyses inform subsequent data collections and analyses. As demonstrated in Figure 6.1, throughout this iterative process, a range of techniques and procedures were adopted to encourage the development of an explanatory model from the emergent data. The remainder of this chapter describes all of these techniques and procedures and explains their relevance to GTM. To assist with this process and to provide examples of the procedures described, references are made to the following chapter (7), which provides

a detailed overview of the emergent findings and how they were responded to throughout the current investigation.

6.6.1 Creating a Memo Structure to Manage the GTM Process

Managing the iterative process of GTM (Figure 6.1) presents researchers with a significant organisational challenge. One analytical strategy that helps to facilitate this is keeping a research diary to detail the ongoing theoretical development, and all sampling and analytical decisions made. A research diary was started in NVivo as soon as the current research question had been identified. Since then it has formed the spine of the entire research process. I created a number of different memos (self-contained text files within and NVivo project) for different purposes and linked these back to the central research diary. These were originally based on the types of memos that Bringer et al. (2004) presented. However, as this research developed, a memo structure was created to suit the specific needs of the project. Initially, a general research diary memo was created, which contained a detailed account of my research activities. This included summaries of my reading activities, meeting records and details of sampling and early analytical procedures. While this was sufficient during the early stages, it soon became apparent that a more complex memo structure was required. The memo structure detailed in Table 6.2 encouraged me to record all relevant information, to facilitate sampling decisions consistent with a GTM based approach. It also provided a workspace to conduct and reflect on the range of analytical procedures and techniques described in this chapter, thus encouraging progressive conceptual development (Charmaz, 2006).

Table 6.2 Different Types of Memo

Name		Description
1.	Research Diary	Records and documents the evolving events that take place during a GTM.
1.1.	Conceptual Development	Describes all analytical processes and decisions made. Can be linked to more detailed conceptual memos where necessary. These memos facilitate an iterative process, theoretical sampling, initial and advanced coding and ongoing conceptual development.
1.2.	General Events	Records general events such as meetings with the research team, training courses attended, important discussions etc.
2.	Reflective	Provide an opportunity to reflect on events and processes such as interviews, or analytical procedures. This can provide valuable personal feedback to inform subsequent sampling and analytical procedures. These memos facilitate an iterative process and theoretical sampling.
3.	Conceptual	Can be attached to nodes and should contain information about the related concepts or categories and about the analytical procedures being carried out to explore them. They provide a workspace for concept development. Conceptual memos can be linked to the research/conceptual development diary. These memos facilitate initial and advanced coding, use of the constant comparative method, asking questions of the data and ongoing conceptual/theoretical development.
4.	Emergent Questions	Summarise emergent themes thoughts and questions so that they can be addressed by further appropriate sampling and analytical procedures. These memos facilitate an iterative process and theoretical sampling.
5.	Explanatory	Can be linked to, to provide more detailed information or descriptions where necessary.
5.1.	Literature Related	A type of explanatory memo that summarises potentially relevant literature. Can be used to link relevant literature into the project. E.g. if the emergent data refers to a previously identified theoretical construct then this can be incorporated into the analysis to help the researcher ask appropriate questions of the data.
5.2.	Technical	A type of explanatory memo. Provide descriptive information about the technical and analytical procedures used. The memos encourage transparency and reflection.
5.3.	Model Descriptions	A type of explanatory model that summarises or describes any models that have been created during the analysis. These help encourage theoretical density.

6.6.2 *Incorporating Literature to Facilitate Early Sampling Decisions*

Due to the exploratory nature of GTM, there is some debate surrounding the use of prior knowledge or previous literature. Early GTM texts stress the importance of conducting the literature review after developing an independent analysis (Glaser & Strauss, 1967; Glaser, 1978; Strauss, 1987). This is intended to avoid imposing pre-conceived ideas into the findings and to allow for the emergent understanding to be constructed from and grounded in the data collected. However, more recent GTM publications extol a more pragmatic approach to incorporating literature into GTM

designs. For example, Corbin and Strauss (2008), acknowledge that researchers will inevitably bring a considerable background in professional and disciplinary literature to their chosen areas of inquiry. Charmaz (2006) also recognises the role of previous literature from a practical perspective (i.e. for developing research rationales and grant proposals), alongside the importance of ultimately allowing the data or emergent theoretical constructs to direct the evolving research process. Further to this, Charmaz (2006) explains that previous literature can assist with theoretical development and help facilitate the constant comparative method by allowing for comparisons to be made between emergent theoretical constructs and other scholars' evidence and ideas. Charmaz suggests that this type of comparison can help "illuminate emerging theoretical categories" (p.165).

As explained previously, this thesis does include an early review of the PA behaviour change literature (Chapters 2 & 3), which ultimately informed the decision to adopt GTM throughout the remainder of the thesis. Alongside providing a rationale, this process also served to satisfy both Sheffield Hallam Universities regulations for embarking on a research degree and the NHS ethics approval process (See Section 4), because in both cases a research proposal and rationale had to be submitted and approved. Consequently, it was necessary to conduct some form of early literature review in this thesis. However, once the decision to adopt GTM was made, the use of pre-existing literature was dictated by the defining characteristics of GTM from a constructivist perspective. Based on this, all theoretical renderings and interpretations had to be justified by explaining how they were ultimately grounded in the emergent data. However, because ultimately the procedures and findings described are the result of my interpretations (as the principal researcher), my own prior knowledge is acknowledged as exerting some influence on these processes.

In addition, by incorporating literature into the ongoing theoretical development process (See specific references in Chapter 7), this thesis is actively recognising its role as both an analytical tool and a platform for the discussion of findings. Consequently, as indicated in Chapter 7, previous literature was sought out and incorporated into the analysis once emergent concepts had been identified from the data. It was used to generate theoretical discussion and explore emergent concepts in more depth. However, to avoid forcing pre-existing ideas into the theoretical development inappropriately and to ensure that decisions to incorporate pre-existing literature were dictated by the emergent data, a critical stance towards any earlier theoretical accounts was assumed throughout. Henwood and Pidgeon (2003) termed this "theoretical agnosticism" (p.138).

As previously demonstrated by Bringer et al., (2006a) NVivo can be used to facilitate the process of incorporating literature into a GTM study. By importing reading notes into NVivo, it is possible to link these to the research diary and use additional linked memos to justify their role in the ongoing conceptual/theoretical development. Specifically, early in the present study, I was required to consider what initial sampling strategy would be most appropriate. Therefore, relevant literature on the different methods was reviewed and imported into NVivo (in either word or PDF formats) where they could be compared to allow for an appropriate *purposive* sampling strategy to be identified. This process was recorded in the research journal, where links could be made to relevant sections of the imported documents or to the analysts own reading notes (i.e. literature memos). Later in the analysis, there were occasions where concepts emerged from the data that were closely related to a body of existing literature (e.g. self-confidence/efficacy). I allowed this literature to inform the ongoing analysis by using it to identify potentially important questions that may be explored in future (*theoretical*) sampling. This was achieved by using literature related memos to summarise relevant reading. These were then linked to the research journal, and in turn to an emergent questions memo, to identify any questions that may need to be explored further⁴. Incorporating literature into NVivo in this manner helped me to monitor the use of literature sources and facilitated purposive and theoretical sampling procedures. Further discussion on incorporating literature into GTM studies is presented in Chapter 8 (Section 2) of this thesis.

6.6.3 Managing Data Documents

Although the data obtained for this study were all interview transcripts, NVivo can accommodate a number of additional types of data (e.g. audio files, videos, digital photos, Word, PDF, rich text and plain text documents). This is an important feature of NVivo because grounded theorists are encouraged to always remain open to new possibilities emerging from the data (Charmaz, 2006) and as a result be flexible with regards to potential data gathering approaches. Therefore, the choice to use CAQDAS did not limit the data gathering and analysis options available.

⁴ Literature was only used in this way to stimulate further exploration of concepts, not to force pre-existing ideas onto the emergent data.

6.6.3.1 Importing Data Documents - Cases and Attributes

When transcripts were imported into the NVivo project, a number of analytical options were available to me. Firstly, NVivo allows for attribute information to be created and stored for each case (each interview). The attribute function was used to record descriptive information pertaining to each interview (e.g. age, sex, marital status of interviewee). The purpose of this was to facilitate future analytical procedures, such as asking questions of the data and making constant comparisons to advance theoretical development. Attributes provided an easy way of differentiating between cases based on known characteristics. Consequently, if a concept behaved differently for different cases then attribute information often provided some early insight into this. However, this type of procedure does have the potential to compromise the iterative nature of GTM because it is difficult to know in advance which demographic factors will actually be relevant. As a result, I only created attributes if they emerged during the coding or concept identification phase as being potentially important. Figure 6.5 presents an extract from my NVivo casebook.

Casebook						
	Sex	Age Range	Chosen Activity	Marital Status	Reason for referral	Years Maintaining ...
2: Cases\Interviews\Interview 1(SD)	Female	56-65	Swimming	Married with Children	Deteriorating Physical Health	6-7
3: Cases\Interviews\Interview 1(SD)\Inte...	Female	56-65	Swimming	Married with Children	Deteriorating Physical Health	6-7
4: Cases\Interviews\Interview 2(LW)	Female	56-65	Gym Work	Married (no children)	Deteriorating Physical Health	6-7
5: Cases\Interviews\Interview 3 (JM)	Female	36-45	Gym Work	Married with Children	Deteriorating Physical Health	7+
6: Cases\Interviews\Interview 4 (RP)	Female	36-45	Yoga & Running	Married with Children	Injury/operation rehabilitation	6-7
7: Cases\Interviews\Interview 5 (MB)	Male	36-45	Gym Work	Married with Children	Deteriorating Physical Health	5-6
8: Cases\Interviews\Interview 6 (NS)	Male	36-45	Gym Work	Married (no children)	Deteriorating Physical Health	3-4
9: Cases\Interviews\Interview 7 (EH)	Female	56-65	Gym Work	Married (no children)	Deteriorating Physical Health	6-7
10: Cases\Interviews\Interview 8 (TW)	Female	36-45	Gym Work	Married with Children	Deteriorating Physical Health	5-6
11: Cases\Interviews\Interview 9 (NW)	Male	46-55	Gym Work	Unassigned	Injury/operation rehabilitation	4-5

Figure 6.5 Extract from NVivo Casebook

6.6.4 Early Concept Identification

An early stage in developing a grounded theory is concept identification, where concepts are identified from distinct events in the data (Corbin & Holt, 2004). This is usually referred to as open or initial coding, where the text (i.e. interview transcript) is opened up and broken apart for intensive scrutiny (Corbin & Holt, 2004). Coding refers to attaching meaning labels to segments of the data (Charmaz, 2006). Through coding, the analyst attempts to explain what is happening in the data. NVivo facilitates this process because it allows for the creation of nodes, which provide storage areas in NVivo for references to coded text (Bazeley, 2007). Therefore, every time I identified a concept from the interview data, a node was created to represent it and the relevant text that pertained to that concept was stored at that node.

To facilitate theoretical development, grounded theorists are encouraged to always think about the codes they are identifying. Charmaz (2006) outlines a number of questions designed to assist with initial or open coding. These include: What process(es) is at issue here? How can it be defined? How does this process develop? How does the research participant act while involved in this process? When, why and how does the process change? By thinking about these questions, grounded theorists are already moving beyond thick description to a microanalysis of their data (Corbin & Strauss, 2008). During open or initial coding, I used linked memos to facilitate analytical thinking. Specifically each time a node was created, I also created a new memo that was linked to that node. In that memo, analytical ideas designed to stimulate further exploration of concepts were recorded. These provided a valuable workspace for the exploration of emergent ideas and their integration into the emergent story. These memos were also linked to and from the research diary to provide an analytical audit trail. This early micro-analysis facilitated the iterative process because it encouraged future sampling directed at finding answers to any early emergent questions.

6.6.4.1 Creating a Node Structure

As more concepts were identified, the number of nodes created increased. To organise these, NVivo allows nodes to have more than one dimension (tree branch). Therefore, I was able to identify where concepts had more than one dimension or group them within a more general concept. This is useful in GTM because it prompts the analyst to think about their concepts in more detail, facilitating conceptual clarity and early microanalysis (Bazeley, 2007). Sorting concepts into branches in trees prompted me to identify common properties and make early comparisons. However, in GTM designs it is important to avoid forcing concepts into categories, therefore tree nodes were only used for concept management and not as an analytical tool. Consequently, my early tree node structure identified very broad categories (See Chapter 7, Table 7.1) and this only changed once I had conducted a number of more in-depth analytical procedures. To avoid an overcomplicated tree structure and unnecessary duplication of nodes, I created a branch of descriptive nodes to allow for the different dimensions of concepts to be coded for (e.g. to differentiate between high and low levels of a particular concept). This avoided having to create dimensional branches for each node but still allowed me to explore the different dimensions of concepts using coding queries (described later).

Despite the fact that open coding does represent an early analytical procedure, it is crucial to recognise that grounded theorists should oscillate between this and more focussed analytical procedures (Charmaz, 2006). This ensures that analysts always remain open to new possibilities emerging from their data. NVivo helped facilitate this, because if at anytime during the analysis a new concept was identified in the data, an additional node was created to represent it.

6.6.5 Conceptual and Theoretical Development

As explained in Chapter 5, GTM attempts to move qualitative enquiry beyond descriptive studies, into the realm of explanatory theoretical frameworks (Glaser & Strauss, 1967; Glaser, 1978; Strauss, 1987). This is achieved by implementing more advanced analytical and coding procedures to ask appropriate questions of the data and further develop emergent concepts and categories. The techniques used and how they are employed, depends largely on the revision of GTM being followed. For example, one common technique for encouraging conceptual and theoretical development in GTM is axial coding. Axial coding refers to the process of relating categories to their subcategories. It is termed axial because coding occurs around the axis of a category, linking categories at the level of properties and dimensions (Strauss & Corbin, 1998). The purpose of axial coding is to begin the process of reassembling data that were fractured during open coding (Corbin & Strauss, 2008). During axial coding, the initial codes are scrutinised to ascertain how some of the identified categories relate to one another and to the overall phenomenon. However, due to the epistemological debates surrounding GTM, not all researchers advocate conducting axial coding because some of the techniques associated with it have the potential to cast a technological overlay on the data (see section on relationship nodes for further discussion). Arguably this can serve to restrict the analytical codes constructed and ultimately jeopardise the emergent, iterative nature of GTM (Charmaz, 2006; Glaser 1992).

Given my constructivist stance, I treated any axial coding related procedures with caution to encourage an iterative process, whereby sampling and analytical procedures were dictated by previously collected data and the emergent findings. Specifically, to encourage conceptual and theoretical development, I utilised a number of more advanced comparative procedures and analytical techniques. This involved examining relationships between concepts, identifying higher order categories and uncovering dimensions such as conditions, contexts, processes and outcomes that ultimately relate to the studied phenomenon. Consequently, my approach to conceptual

development was more akin to the theoretical coding related techniques described by Glaser (1978). Like axial coding, this focuses on developing early codes and concepts, created during initial coding, by specifying potential relationships between them (Charmaz, 2006). However, to assist with this Glaser (1978) proposed a number of relatively broad coding families designed to help researchers explore how different concepts might relate to one-another. By acknowledging a wide range of potential relationships, I was encouraged to explore all my emergent concepts in considerable depth. A number of different NVivo functions are now described with specific reference to how they contributed to the development of the present study. As explained in Section 6.1, memos provided a valuable link between all the analytical procedures described in this chapter and the overall theoretical development and emergent explanatory account of the studied phenomenon.

6.6.5.1 Coding Stripes

One function of NVivo I found particularly useful for early conceptual development was the coding stripes function. Coding stripes allow the researcher to view segments of text or whole documents and see what additional nodes are coded to that particular selection of text. Consequently, they facilitate the task of comparing categories and concepts (Bringer et al., 2006). I used coding stripes to provide a visual overview of how the nodes created (emergent concepts) might relate to one-another (See Figure 6.6 for an example).

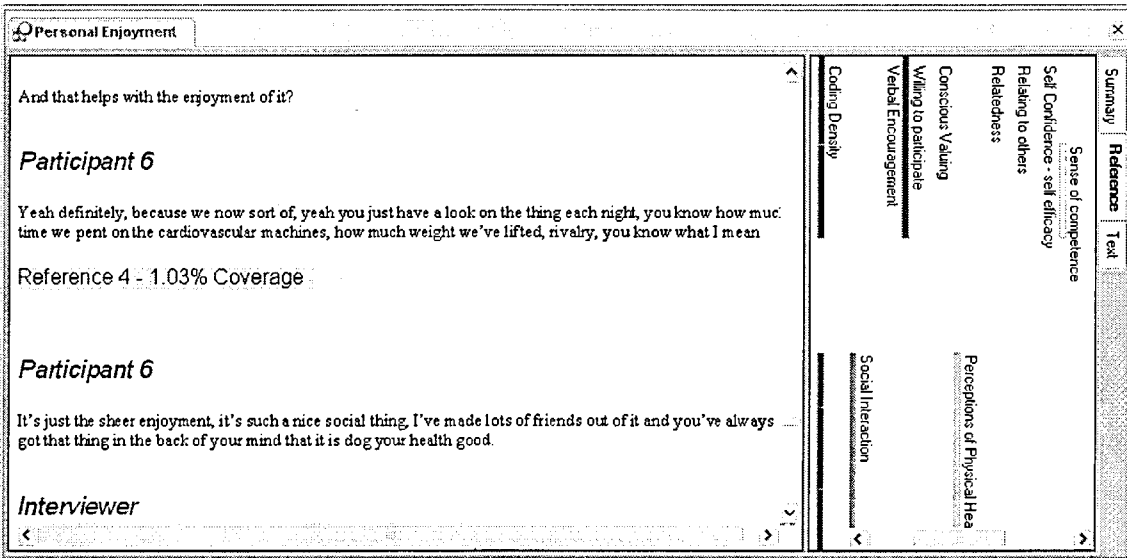


Figure 6.6 Coding Stripes on a Node

6.6.5.2 Asking Questions Using Coding Queries

Corbin and Strauss (2008) explain that good questions should enhance the development of the evolving grounded theory. Questions such as who, when, why, where, what, how, with what results etc. are commonly encouraged. Devising more specific questions based on these encourages a thorough examination of concepts, categories, and subcategories (Charmaz, 2006). To facilitate appropriate questioning of the data, I regularly used the coding query function to scrutinise specific segments of data deemed relevant to a particular line of enquiry. This usually involved searching for intersecting coding (i.e. searching for text coded to more than one node).

An additional strategy for advancing theoretical development that relates closely to advanced coding procedures, questioning and the constant comparative method is the flip flop technique (Strauss & Corbin, 1998). It is a comparative procedure which I used to obtain further insight and bring out potentially significant properties. It involves turning a concept 'inside out' or 'upside down' to obtain a different perspective on the event, object, or action/interaction (Strauss & Corbin, 1998). The query function of NVivo easily facilitates this because coding queries are based on Boolean logic (See Figure 6.7 for example) and so allow the analyst to select from a number of options (e.g. AND, OR, NOT).

6.6.5.3 Sets

Another valuable NVivo tool for advancing theoretical development is sets. I used sets to cluster nodes together into broader concepts based on potentially meaningful relationships. They represented a useful exploratory tool because by grouping project items into sets I was not changing the node structure or duplicating items, but simply saying that these items may belong together in some way (Bazeley, 2007). The sets created were often also incorporated into queries as single units of data. This allowed me to ask questions of the broader concepts I had identified.

6.6.5.4 Matrix Coding Queries

Another type of NVivo search tool that I used for conceptual and theoretical development is the matrix coding query function. This, allowed me to investigate relationships between concepts and categories by searching for data coded to multiple pairs of items simultaneously. Specifically, I used matrix coding queries to identify potential sub-categories and dimensions of higher order concepts and to make multiple comparisons between cases and concepts.

6.6.5.5 The Paradigm Model and Relationship Nodes

To assist researchers with axial coding, Strauss and Corbin (1990; 1998; Corbin & Strauss, 2008) introduced the paradigm model or coding paradigm. They explain that axial coding involves relating structure with process, where structure or conditions set the stage or create the circumstances in which issues or happenings pertaining to a phenomenon arise and process denotes the action/interaction over time of persons, organisations and communities in response to issues or happenings (Strauss & Corbin, 1998). Therefore, the paradigm provides an organisational scheme to help capture the dynamic nature of events (Strauss & Corbin, 1990), encouraging analysts to gather and order data in such a way that structure and process are integrated. However axial coding related procedures, like the paradigm, assume quite an objective stance because they encourage researchers to fit their data to a relatively limited framework (Dey, 1999). Consequently, it is not congruent with all epistemological perspectives and their related revisions of GTM. However, Strauss and Corbin (1998) do stress that the paradigm should be used with caution and that its components are intended as a guide to help analysts ask appropriate questions of their data and not as a framework to fit their data to.

Given that I was concerned about forcing the data to fit a given framework, I chose to only use the paradigm as a source of information to stimulate in-depth exploration of concepts. I did not look for specific conditions, actions/interactions and consequences, but by acknowledging it alongside Glaser's coding families, it did help me to recognise the complexities of potential relationships. To facilitate this, I used NVivo's relationship node tool. Relationship nodes can be used to record a connection of a particular kind between two project items. The relationship can be a simple association, or it can have one or two-way (symmetrical) directionality. The particular type of relationship can also be defined (e.g. encourages, reduces, supports, leads to etc.). Because relationships are stored as nodes it is also possible to code data to them. Consequently, when I identified a potential relationship between any emergent concepts, I defined these in NVivo using the relationship tool and created relationship nodes to represent them. As I discovered more about the nature of these relationships by exploring other concepts and segments of potentially relevant data, I could then code any evidence deemed relevant, to the corresponding relationship nodes. This enabled me to examine all the potentially relevant data, for each relationship, in one place and meant I could use functions such as coding stripes to assist with this process. This helped to identify any other concepts or processes which contributed to that relationship

and what their role was (e.g. do they act as mediators, moderators, consequences or conditions?). Consequently, the relationship tool provided me with a valuable way of exploring the complexities of potential relationships without forcing data to fit specific categories. Figure 8 demonstrates a number of different types of relationship.













Relationship Types					
	Default	Name	Direction	Created On	Created By
	✓	Associated		24/08/2006 11:30	A J H
		Influences		11/04/2008 08:51	A J H
		Causes		11/04/2008 08:54	A J H
		Increases		18/04/2008 16:37	A J H
		Reduces		18/04/2008 16:38	A J H
		Interaction		18/04/2008 16:38	A J H

Figure 6.7 Types of Relationships in NVivo

6.6.5.7 Models

Another technique used commonly by researchers to facilitate the development of grounded theories is the use of models or diagrams (Holt & Dunn, 2004). NVivo facilitates this because it contains a model building tool, which allows project items (e.g. nodes, relationships, sets) to be presented diagrammatically. I used models throughout the research process to visually examine many of my analytical observations. As the GTM process developed, analytical observations became more complex and multi-dimensional. However, by producing visual representations of these increasingly complex observations (e.g. showing the various dimensions of a particular category and how they interact/relate to other concepts and categories), it became easier to explore relationships which may otherwise have been difficult to conceptualise. Models also helped to identify gaps in the emergent understanding because I used them to summarise findings. For example after each iteration (the data collection & analysis phases depicted in Figure 6.1), I created NVivo models to summarise the theoretical and conceptual development. These models were accompanied by linked explanatory memos, which together were used in subsequent data gathering (interviews), to stimulate questioning directed at either the further development of concepts and categories or addressing gaps in the emergent understanding. All models created in NVivo can be *static* or *dynamic*. This means that if changes occur to associated NVivo project items, the analyst can choose whether or not to allow models to be automatically updated. Figure’s 7.3 and 7.4 in Chapter 7 represent summary models created for the purposes of the present study.

6.6.6 The End of the Grounded Theory Process

As explained in Chapter 5, the end of a GTM based study is marked by what is referred to as theoretical saturation. Charmaz (2006) explains that saturation is reached when collecting additional data no longer sparks new theoretical insights. The memo function of NVivo was used to keep a detailed account of the ongoing theoretical development and all sampling and analytical decisions made. As well as helping identify gaps in the emergent data, this also provided an indication of when categories had reached saturation. Specifically, by following the links I had created to associated models and conceptual memos, it was possible to see whether there were any outstanding emergent questions or theoretical possibilities that had not been explored.

The final grounded theory should represent an explanatory model of the studied phenomenon grounded in relevant empirical data (Glaser & Strauss, 1967). Consequently, it is commonly accepted that there must be evidence of theoretical density or depth to the observations presented, resulting in the presentation of a theory from which hypotheses can be generated (Charmaz, 2006; Corbin & Strauss, 2008; Glaser & Strauss, 1967). NVivo helped to present this evidence because I was able to go back through the conceptual development diary and highlight the specific lines of enquiry and analytical techniques that were conducted along the way. The model building tool also helped provide evidence of theoretical density because it ultimately allowed for a visual representation of the core categories and their various dimensions to be presented.

6.7 Chapter Conclusions

This chapter has presented a detailed account of both the sampling and analytical methods and procedures adopted for this study. It demonstrates that GTM represents a flexible, iterative process of active involvement by the researcher, which centres on the development of a theoretical account of the studied phenomenon. This chapter has also presented a strong argument to suggest that QSR-NVivo can be used to facilitate this process. Ultimately, the techniques and procedures reported in this chapter are representative of my own epistemological assumptions and theoretical perspective, and therefore reflect a largely constructivist approach to GTM. While many of the methods described are consistent with the common characteristics of GTM described in Chapter 5, some of the techniques and procedures described may not be congruent with every grounded theorist's epistemological viewpoint or theoretical perspective.

Chapter 7: Theoretical Development of Emergent Concepts and Categories

7.1 Introduction

Chapter 6 provided a detailed description of both the sampling and analytical procedures adopted throughout this GTM study. As explained previously, the specific methods and procedures adopted are representative of the key characteristics of GTM (See Chapter 5) and my own epistemological standpoint (See Chapter 4). While Chapter 6 identifies and describes these techniques and procedures, it does not demonstrate exactly how this GTM study developed using them. Therefore, the aim of this chapter is to present a transparent account of the evolving analytical processes that led to the final grounded theory presented in Chapter 8. Consequently, a detailed account of the early concept identification related procedures and the subsequent conceptual and theoretical development are presented. Throughout this chapter, the reader is encouraged to refer to the Glossary of Terms provided at the front of the thesis and to Chapter 6, for descriptive information about the specific procedures and techniques employed. Where references are made to relevant literature, this is to demonstrate that literature sources were referred to, to stimulate theoretical development (See Chapter 6, Section 6.2 for further discussion surrounding incorporating literature into GTM studies).

7.2 Early Concept Identification and Descriptive Observations

Early purposive sampling involved conducting six in-depth interviews. The resultant initial coding of this interview data led to the development of an early descriptive account and helped direct subsequent lines of enquiry through theoretical sampling. The first person pronoun is used throughout this chapter to emphasise the role of, the principal researcher, in the decision making process. For further discussion on the decision making processes and the role of the principal researcher and other members of the research team, see Chapter 10.

7.2.1 Initial Coding Summary

Initial coding led to the identification of 31 different codes (NVivo nodes; See Chapter 6, Section 6.4 for more information on nodes). Table 7.1 presents a summary of the node structure after six interviews. The majority of the initial codes represented

instances where individual *cognitions or perceptions*⁵ (16 nodes) were being referred to. I also identified and created nodes that related to *actions* (6 nodes). These represented references to behavioural processes experienced or observed by the interviewees. A further category, *sources of support* (2 nodes), was created to represent the different types of support referred to. Finally, I created a number of *descriptive* nodes (7 nodes) to allow for *time* and the different descriptive dimensions of nodes to be coded for and subsequently explored (e.g. to differentiate between *high & low* levels of *enjoyment* or *perceived competence*). All of the aforementioned nodes were organised into a preliminary tree structure in NVivo (See Chapter 6, Section 6.4 for details on tree nodes in NVivo).

Table 7.1 Node Summary after Initial Coding of Interviews 1 to 6

Descriptive Tree	Related Child Nodes	Additional Child Nodes	References	Sources
Cognitions/Perceptions	1. Desire for Change		(5)	2
	2. Determination		(12)	4
	3. Emotional Arousal		(19)	6
	4. Enjoyment		(39)	6
	5. Extrinsically Motivated		(37)	6
	6. Environment		(29)	6
	7. Feeling Understood		(12)	5
	8. Health Related Perceptions		(42)	6
	9. Intrinsically Motivated		(12)	3
	10. Perceived Effort		(25)	6
	11. Perceptions of Competence		(14)	6
	12. Relating to Others		(14)	6
	13. Reluctant to Participate		(17)	5
	14. Self-Confidence		(9)	6
	15. Sense of Achievement		(32)	6
	16. Willingness to Participate		(23)	6
Actions	17. Instances of Willing Participation		(18)	5
	18. Meeting Individual Needs		(20)	6
	19. Overcoming Barriers		(14)	5
	20. Participation Lapses		(10)	4
	21. Social Interaction		(17)	6
	22. Verbal Encouragement		(12)	4
Types of Support	23. Health Professional Facilitated Support		(38)	6
	24. Socially Facilitated Support		(29)	6
Dimensions/Descriptives	High/Low (Parent Node)	1. High		
		2. Low or Lacking		
	Positive/Negative (Parent Node)	3. Positive		
		4. Negative		
	Time (Parent Node)	5. Pre-Referral		
		6. During Scheme		
		7. Post-Scheme		

⁵ All references to nodes created throughout the development of this grounded theory appear in the text in *italics*, to stress that these represent emergent data themes.

The concepts listed in Table 7.1 represented the starting point for the analytical phase of the study. To begin to develop an understanding of successful PA behaviour change, at this stage of the GTM process, I was interested in exploring how these initial concepts might relate to PA behaviour change.

7.2.2 Early Conceptual Memos and Microanalysis

As new nodes were identified and created from the raw data, conceptual memos (Chapter 6, Section 5.2) were linked to them to facilitate the exploration of emergent concepts. Figure 7.1 illustrates a memo for the node *enjoyment*, where early analytical observations and procedures were documented. These early analytical processes are often described as micro-analysis (Corbin & Strauss, 2008). What follows is a summary of the early micro-analytical procedures and subsequent insights gained, from the concepts listed in Table 7.1.

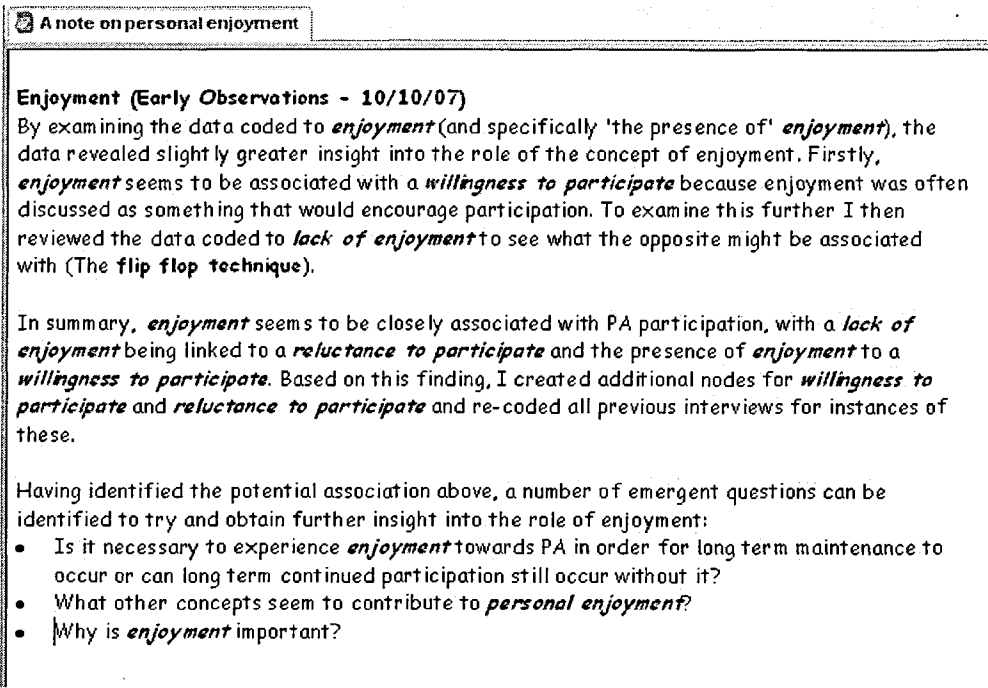


Figure 7.1 Early Conceptual Memo for the Node "Enjoyment"

7.2.2.1 Maintenance Stability

From the outset, I started to make comparisons between the different accounts of PA behaviour change. This revealed differences between the characteristics of the various interviewees. For example, I observed that continued PA participation was much easier for some individuals than for others. This became evident by exploring the data coded at the node *effort* (See Table 7.2 for a sample of quotes coded at the node *effort*). The node *effort* was created to represent the many references to the physical and mental exertions experienced by the interviewees. Most references to *effort* were also

coded at either the *high* or *low* dimensional node, indicating that on some occasions individuals referred to their participation being effortless, whereas on others it was effortful. By mapping coding stripes on to quotes coded at *effort* (See Chapter 6, Section 6.5 for more details on coding stripes), a number of potential relationships started to emerge between the early concepts. These led to the identification of some early descriptive characteristics of successful maintainers, which centred on *effort* and a preliminary higher order construct that I labelled stability.

Table 7.2 Sample Quotes Coded at "Effort"

Quotes Coded at "Effort"	Source
"Yes, I think sometimes it's time or the effort the get to where the exercises are and you know as I said it was something I was looking for rather than something I had to do, and that made it easier."	SD (1)
"It is a chore to get there and again if your mind is not completely on it, it can be hard."	MB (5)
"So I had to force myself to go on certain days of the week. But at the moment its mental motivation, that's what it is because if I really put my mind to it I could always find time somewhere."	LW (2)
"I do generally do it for myself erm it doesn't take any effort, you know I get up in the morning, do my yoga, do my walking or running. I just do it because that's me I think."	RP (4)
"I'm struggling a bit at the moment to get through the door (reference to going to the gym). But I've told myself, I've got to get going and get this weight off."	LW (2)
"Hmm the first 6 or 7 months wasn't a chore because it was through the summer, erm but then I must admit sometimes you'd get home on a winters night and you really just can't be bothered, especially on your own funnily enough."	NS (6)
"Once its in the diary its just there, you know you'll just be there at that time and sometimes you don't really think about where you're going, you just know you've gotta be there at that time and you don't think bloody hell I don't wanna go to the gym. You just make that appointment and just go. Do you know what I mean? Its just part of what you do."	JM (3)

After making additional between case (interviewees) comparisons, I realised that the observed variations described above, were also evident in a number of the other early concepts. Specifically, a relationship was observed between *effort* and the concepts *willingness to participate*, *reluctance to participate*, *instances of willing participation*, and *participation lapses*. Using coding stripes and coding queries (See Chapter 6, Section 6.5 for more details on coding queries), I observed that *willingness to participate* and *reluctance to participate* appeared to represent a cognitive dimension of *effort* because they were all references to perceived levels of mental exertion. I also noted that *instances of willing participation*, (e.g. actively *overcoming potential barriers*) and *participation lapses* represented actions associated with either *high* or *low* levels of *effort*. By identifying theses potential associations, the data was already starting to reveal some insight into the characteristics of successful maintainers.

To account for these observations, I created a higher order concept labelled stability to describe how *willing* people are to continue participation, how much *effort* they need to invest to do so and the likelihood of temporary behavioural *lapses* (i.e. reduced PA participation levels). Stable maintenance appeared to be characterised by *willing, effortless, enduring* participation and unstable maintenance by increased feelings of *reluctance*, greater investment of *effort* and an increase in *participation lapses*. By making comparisons over *time*, I also observed that stability should not be interpreted as a dichotomy (i.e. individuals are either stable or unstable) but rather as a continuous variable that can vary over *time*. Figure 7.2 illustrates this emergent finding by presenting the concept of maintenance on a continuum of stability.

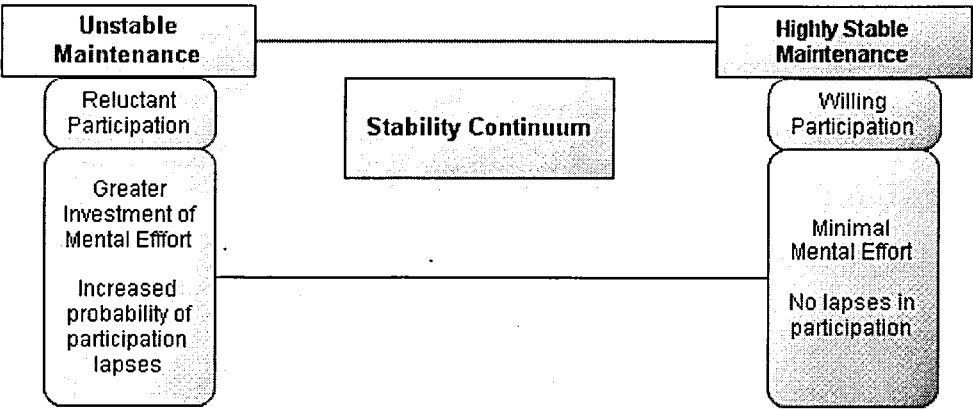


Figure 7.2 Proposed Stability Continuum

Based on the above findings, stability appeared to represent a key consequence or outcome of the PA behaviour change process. Therefore, in order to fully understand how people successfully change and maintain their PA related behavioural changes, the causal conditions, actions/interactions etc. associated with the differing degrees of stability needed to be explored. Throughout early data collection and analysis, a number of additional categories and concepts were identified. These emerged from the data as being important for successful maintenance because they were identified by the participants as playing a significant role in their own successful change experiences. Therefore, it was these concepts and categories that began to help explain how successful maintenance occurs and why it varies in terms of its stability.

7.2.2.2 Exploring Enjoyment

A commonly referenced initial node after the earlier interviews was *enjoyment*. To explore its relevance, all data coded at this node was examined using coding stripes.

This revealed evidence to suggest that *enjoyment* is closely related to an individual's *willingness to participate* (i.e. the more enjoyable the activity is the more willing they are to participate) and is a product of a number of *social* and *environmental* influences. Specifically, much of the data coded at *high* levels of *enjoyment* were also coded at the *willingness to participate* node, whereas *low* levels of *enjoyment* were often coded at *reluctant* participation. Visual inspection of that data confirmed that *enjoyment* was a potentially important characteristic of stable maintenance. Coding stripes also provided contextual information about the *enjoyment* concept by identifying some of its potential sources. The most prominent of these were *social interaction* with peers and *health professionals*, and a comfortable *environment*. Conversely, *low* levels of *enjoyment* were often described alongside *negative environmental* perceptions or a sense of social exclusion/failure to *relate to others*.

7.2.2.3 Exploring Emotional Arousal

During examination of the *enjoyment* node, coding stripes revealed another concept that appeared to be related to it in some way. Specifically, many references to *enjoyment* were also coded at a concept labelled *emotional arousal*. I identified *emotional arousal* during initial coding to reference instances where people described emotional responses. By viewing all of the references coded at *emotional arousal*, I soon observed that the majority of these had also been coded at either the *positive* or *negative* descriptive/dimensional nodes. Using a coding query, I was able to compare the two data sets that represented *positive* and *negative emotional arousal*. This revealed that *positive emotional arousal* included references to *enjoyment* and described instances of excitement/adrenalin rushes, whereas *negative emotional arousal* included references to emotions such as dislike, anxiety and boredom.

Table 7.3 Sample Quotes Coded at "Emotional Arousal"

Quote	Dimension - Observed Emotion	Source
"There were people who were sort of shivering with fear at the thought of getting in the water, so just getting over the fear was a lot of it."	Negative - Fear/Anxiety	SD (1)
"I've always got an adrenalin rush from doing my exercises. There's the sense of achievement, the feel good factor."	Positive - Enjoyment/Excitement	RP (2)
"At first I didn't really want to go, I was a bit frightened, thinking that if I go to the gym I might do the wrong thing."	Negative - Fear/Anxiety	LW (2)
"Classes are all very friendly, you get to know people. You know, you're sort of laughing and enjoying it while you're doing it as well."	Positive - Enjoyment	SD (1)
"They showed me my blood pressure and what it should be, which shocked me and it gave me a bit of a spurt."	Negative - Fear/Anxiety	NS (6)

Based on the above observations, I was interested to understand how *emotional arousal* relates to PA behaviour change? Specifically, *positive emotional arousal* seemed to always be associated with the characteristics of stable participation or maintenance (i.e. references to *willing, effortless* participation also contained references to *positive emotional arousal*). However, although the different types of *negative emotional arousal* did seemed to be more closely associated with the characteristics of less stable (i.e. *reluctant, effortful*) participation, there was evidence to suggest that they can exert a *positive* influence on PA participation. For example, when the data described instances where individuals were anxious about their own health, this often acted as a source of encouragement, making them more *determined* to maintain or increase PA participation (e.g. Table 7.3, quote from participant 6). There was also evidence to suggest that *negative* emotions, such as boredom or anxiety, directed towards actual participation, tended to be associated with *reluctance* and *participation lapses* (e.g. Table 7.3, quote 3). Therefore, while *positive* affective states seemed to be associated with more stable enduring participation, *negative* emotional responses appeared to have either a *positive* or *negative* influence depending on what they were directed towards and how they were subsequently interpreted. Coding stripes mapped onto the *emotional arousal* node provided insight into the various sources of *emotional arousal*. Specifically, I identified the following concepts as potential sources of *emotional arousal*: *health related perceptions, social interaction, sense of achievement* and *perceptions of competence* (Figure 7.3).

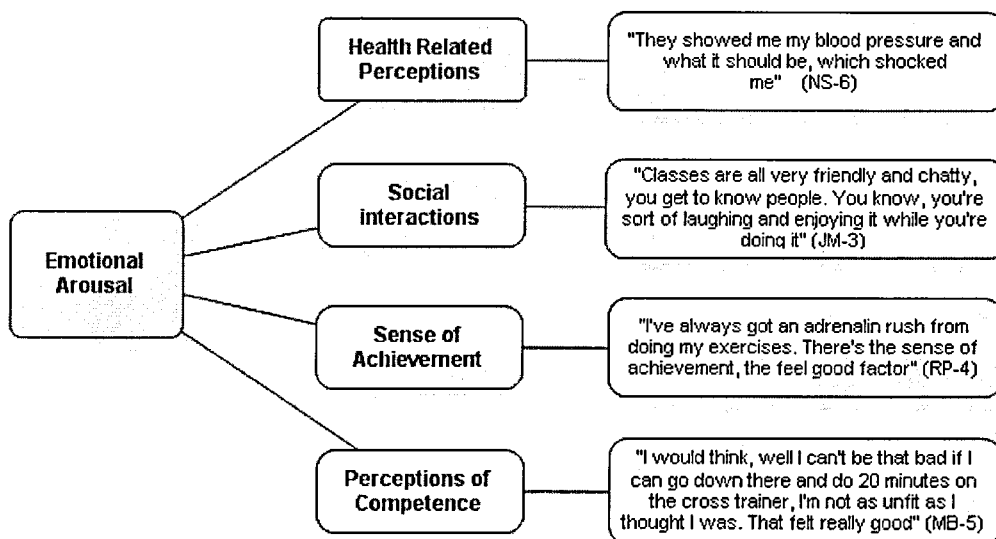


Figure 7.3 Potential Sources of Emotional Arousal

Perceptions of Physical Health

During initial coding I created a node called *health related perceptions* to reference instances where the interviewees described a conscious awareness of their own health. Again, data coded at this node was also regularly coded at either the *positive* or *negative* dimensional nodes to differentiate between an awareness of good or poor health. When I examined the data (using a coding query) coded at *positive health related perceptions*, I observed that for successful maintainers this awareness of good health was only evident *during* or *after* their participation in the referral scheme and was closely related to a *sense of achievement* and *positive emotional arousal*. Therefore, these early observation appeared to suggest that participation related experiences represent an important source of positive health perceptions, which can contribute to a *sense of achievement* and positive emotional responses.

When data coded at *negative health related perceptions* was explored, I observed that these were described both *pre*, *during* and *post-scheme* and were related to negative emotions (e.g. anxiety) and the concepts *determination* and *desire for change*. The node *determination* was created to reference instances where interviewees described being resolute in their PA participation related intentions. Consequently, it was often coded alongside references to *high* levels of *effort*. *Desire for change* was created as a node to reference instances when interviewees expressed an explicit desire to make changes to their PA habits. Therefore, early observations suggested that when successful maintainers perceive their health to be poor, they respond to this and its

associated *emotional arousal*, by desiring change or by becoming more resolute towards the changes they have already implemented.

Sense of Achievement, Perceptions of Competence and Self-Confidence

Nodes were also created to represent references in the data to the interviewees experiencing a sense of accomplishment and perceiving themselves to be competent with regards to their chosen PA pursuits. When I reviewed the data coded at both of these and made comparisons between them, I realised that they were often references to the same passages of text. Closer inspection revealed that this was only the case when *perceived competence* was *high*. Therefore, *high* levels of *perceived competence* seemed to represent an *achievement* or accomplishment, suggesting that it might be something that successful maintainers ascribe importance to. This was further supported when I examined data coded at *low perceptions of competence* and discovered that the relevant segments of text also commonly referred to *reluctant participation*. Therefore, when individuals fail to achieve a *sense of competence*, within their chosen PA pursuits, this might act as a threat to continued participation.

A concept that emerged as being potentially related to *sense of achievement* and *perceptions of competence* was *self-confidence*. *Self-confidence* represents an *in vivo* code that was created to represent the many references to it within the interview data. Interviewees commonly explained that at different times in their PA participation, they felt *more* or *less confident* and this appeared to impact on their *willingness to participate*. By reviewing the data coded at *high self-confidence*, I observed that when interviewees described feeling confident, they also felt more *willing to participate* and described *positive* affective responses (e.g. enjoyment). Conversely, *low self-confidence* seemed to be associated with *negative* emotional responses (e.g. anxiety) and *reluctant participation*. Levels of *self-confidence* seemed to be influenced by *achievement*, *physical health* and *competence* related perceptions, and encouragement from *social* or *professional* sources.

Social Interaction

The final concept that was identified as a potential source of *emotional arousal* was *social interaction*. *Social interaction* appeared to represent an important source of *enjoyment* because data coded at it often described *enjoyment* as an associated response. To explore this further, I used a coding query to examine all the data coded at both these nodes. After inspecting this data, I created an additional node called *relating to others* to

describe instances where people appear to establish a social assimilation with others and a shared sense of purpose. This process of *relating to others* seemed to offer a potential explanation as to why people respond *positively* to *social interaction*, suggesting that they are happier in environments where they can socially relate to people (See Table 7.4).

Table 7.4 Sample Quotes Coded at "Social Interaction"

Quote Coded at "Social Interaction"	Related Concepts	Source
"I think what we have here is very special because we all really bonded as a group and the staff were friendly and enjoyed us coming because we had a laugh with them."	Relating to Others Enjoyment	SD (1)
"I'm not being funny but when I got there I saw somebody about twice the size of me, and I got on and enjoyed it because it was reassuring to mix with other people in a similar situation."	Enjoyment Relating to Others	NS (6)

7.2.2.4 Exploring Different Sources of Support

As indicated in Table 7.1, instances of *socially facilitated support* and *health professional facilitated support* were coded from the interview data. They were identified because they appeared to provide contextual information regarding many of my early observations. Specifically, data suggested that continued PA participation is facilitated by both social (e.g. friends, family) and health professional (e.g. GP's, gym instructors) related sources. By creating codes to represent these, I was actively identifying instances where successful maintainers were drawing on or benefitting from various types of support to facilitate their own ongoing participation. Inspection of the data coded at these two nodes revealed that they appeared to be closely related to a number of the other concepts. Therefore, they represented higher order processes that involved both cognitions/perceptions and actions. By exploring these, it helped me to identify two potential relationships and some additional concepts that might play an important role in maintained PA participation.

First, social situations and their associated *interactions* appeared to provide a number of supportive mechanisms for the interviewees. As explained above, one of these was that they could help facilitate individuals feeling more comfortable in their exercise environments, through helping them *relate to others*. In addition, data coded at *socially facilitated support* also revealed that people described how social situations help develop their sense of *competence* and *confidence*, by allowing them to compare themselves to others and through receiving *verbal encouragement* (See Table 7.5).

Table 7.5 Sample Quotes Coded at "Social Support"

Quote Coded at "Socially Facilitated Support"	Related Concepts	Source
"Not long after I gave up my work, my husband had a bad leg injury and I got him involved too. I mean we were going four or five early mornings a week then, which was great because we could chivvy each other along."	Verbal Encouragement	SD (1)
"It's nice to have a range of people exercising with you, people who you feel a little bit akin to."	Relating to Others	LW (2)
"The social understanding of what benefits I get out of it are important. If you're stood next to a guy at the bus stop who's slightly out of breath, then you feel better than the next man because you feel that you are doing more, which makes me feel confident."	Perceived Competence Self-Confidence	MB (5)

Second, interactions with health professionals were also described when interviewees were explaining mechanisms behind their continued participation. Exploration of the data coded at *health professional facilitated support* led to the identification of a concept labelled *meeting individual needs*. Individuals appear to respond more *positively* (i.e. more *willing to participate*) when they perceive that their personal needs are being met and this is usually accompanied by a sense of being *understood*. For example:

"The woman that ran it was very very good and she was probably the only one I've met that new quite a lot about most things. She was very considerate and if you couldn't do something then she would understand and give you an alternative, she recognised what we needed" (LW-2).

Through *verbal encouragement* and the tailoring of PA programmes, health professionals appeared to be able to contribute significantly to this process of *meeting individual needs*. Therefore, the identification of the concept *meeting individual needs* suggested that an important characteristic of successful maintainers is a sense that their PA participation is congruent with their own needs.

7.2.2.5 Exploring Motivation

During initial coding, it became apparent that it might be necessary to understand initial motivation, in order to make comparisons over *time* and understand what changes have occurred. To assist with this, the concepts *intrinsic* and *extrinsic motivation* were considered during the analytical process and nodes were created to represent them. Traditionally, *extrinsically motivated* behaviour refers to behaviour performed in order to attain some separable outcome (e.g. increased fitness, social praise, financial reward etc.), whereas *intrinsically motivated* behaviours are performed

for their inherent satisfaction (Ryan & Deci, 2000). By making comparisons between cases, I observed that individuals who appeared *intrinsically motivated* from the outset, were more likely to demonstrate stable maintenance. However, this type of initial motivation appeared to be very rare because the majority of people reported participating to attain a separable outcome (e.g. improved fitness, prolong life, improve quality of life etc.), and most of the sample were initially instructed by a health professional to start the scheme. I also observed that although changes occurred in motivation over *time*, most of the participants remained *extrinsically motivated*. Consequently, in order to understand why some people demonstrated more stable participation than others, it seemed necessary to look beyond the concepts of *intrinsic* and *extrinsic motivation* to find out what more specific characteristics individuals need to possess to be able to make enduring behavioural changes and why.

7.2.3 Early Summary Model

Figure 7.4 summarises my early observations from this initial coding phase and the associated microanalysis that took place. It demonstrates that after the coding and analytical procedures described above, a descriptive account of the characteristics of successful maintainers had started to emerge. The model reveals that successful maintainers referred to a number of different types and sources of information when describing the mechanisms behind their own continued participation. The information received was then interpreted and this resulted in a number of cognitions, which appeared to represent important determinants of either stable (those on the right) or less stable (those on the left) maintenance. Often, these interpretations would be accompanied by an emotional response (e.g. anxiety). Ultimately, these different cognitions appeared to directly influence PA related behavioural responses (i.e. more or less stable maintenance).

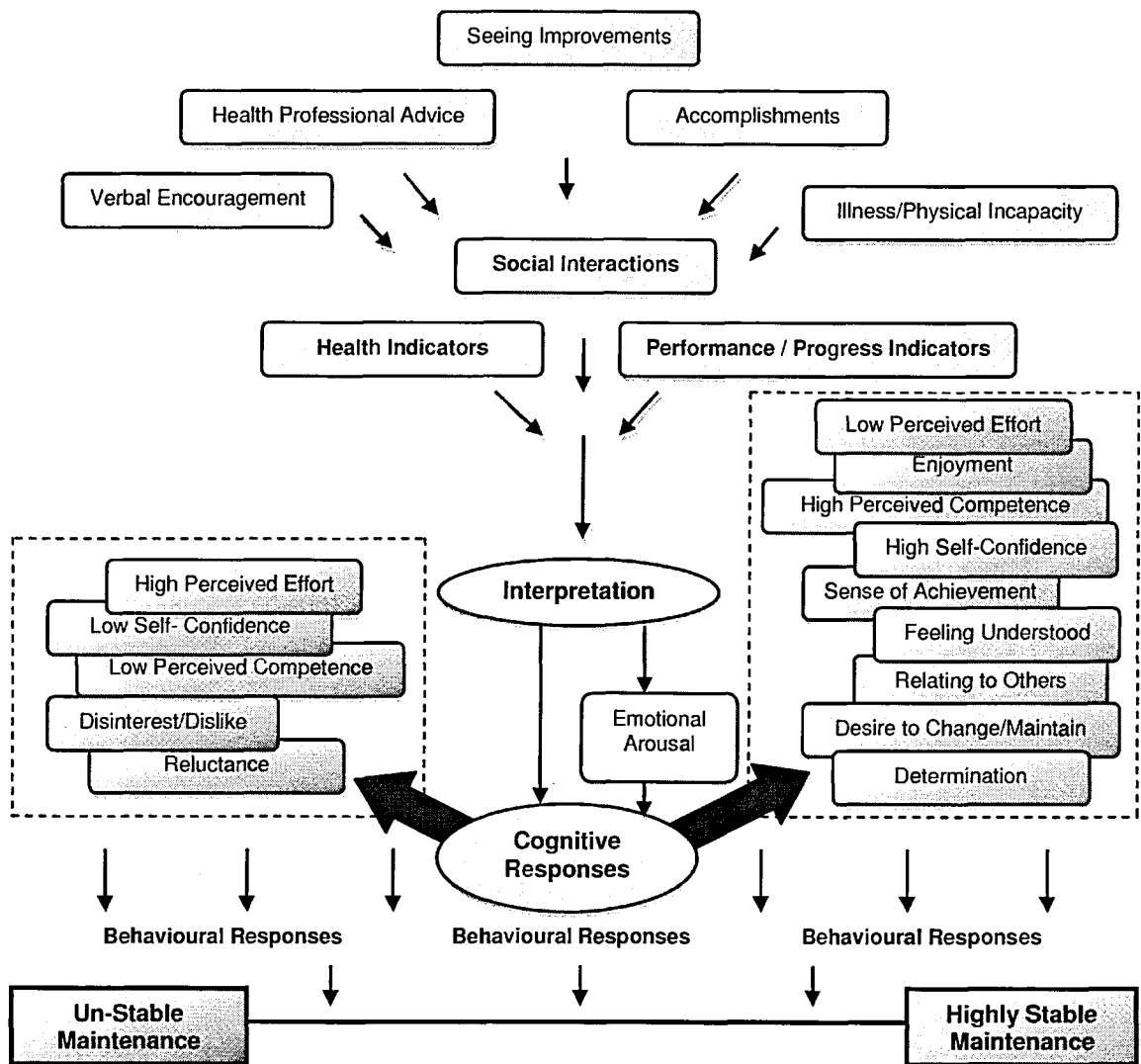


Figure 7.4 Summary Model after Initial Phase

7.3 Responding to Early Emergent Concepts and Categories

As well as summarising the emergent understanding and analytical development after the first phase of interviews, Figure 7.4 also identified gaps in that understanding and helped direct future lines of enquiry. For example, the early insights did not capture any process related information (i.e. changes over time). Therefore, questions such as, why do people initiate change? and what changes occur over time to facilitate maintenance? still needed to be addressed. In addition, specific aspects of the emergent understanding presented in Figure 7.4 could also be examined in more detail. For example, the emergent understanding suggested a link between people's cognitive perceptions and their behavioural actions (i.e. certain cognitions appear to be associated with more stable participation than others). However, it was not clear why this was and why some individuals emphasised different cognitions but demonstrated similar behavioural responses. Consequently, if similar observations emerged during

subsequent interviews, I was able to direct my questioning more specifically to generate further insight. This section of the chapter describes the second phase of data collection (interviews 7 to 12), with reference to how I addressed gaps in the emergent understanding and responded to the various insights reported previously.

7.3.1 Coding Summary

Initial coding of the second phase of interviews resulted in additional references being made to some of the previously identified codes. These prompted me to further explore a number of the previously identified concepts. I also created 20 new nodes, four new node categories (descriptive trees) and re-named some of the previous nodes and categories. These additions and changes represented further insight gained from the more recent interview data. For a summary of my node structure after 12 interviews, see Table 7.6 (all changes and new nodes have been highlighted; the seven dimensional/descriptive nodes listed in Table 7.1 remain unchanged, so are not included in this table).

Table 7.6 Node summary after initial coding of interviews 7 to 12

Descriptive Tree	Related Child Nodes	Additional Child Nodes	References	Sources
Un-assigned Cognitions				
	1. Control/Behavioural Regulation		(72)	12
		2. Internal	(60)	12
		3. External	(12)	5
	4. Desire for Change		(16)	7
	5. Determination		(17)	7
	6. Emotional Arousal		(45)	10
	7. Enjoyment		(52)	12
	8. Extrinsically Motivated		(64)	12
	9. Intention		(34)	10
	10. Intrinsically Motivated		(17)	5
	11. Perceived Effort		(45)	12
	12. Reluctant to Participate		(32)	11
	13. Willingness to Participate		(53)	12
Sources/Perceptions				
	14. Experiences of Poor Health		(35)	11
	15. Health Related Perceptions		(79)	11
	16. Feeling Related to Others		(36)	12
	17. Feeling Understood		(23)	10
	18. Information or Advice Giving		(27)	10
	19. Perceptions of Competence		(20)	10
	20. Sense of Achievement		(52)	12
	21. Sense of Shared Purpose		(12)	8
	22. Verbal Encouragement		(25)	8
	23. Vicarious Experiences		(14)	6
Attitudes/Beliefs				
	24. Outcome Orientated Beliefs		(38)	12
	25. Self-Efficacy Beliefs		(18)	10
	26. Socially Orientated Beliefs		(35)	11
Actions				
	27. Instances of Willing Participation		(46)	12
	28. Meeting Individual Needs		(32)	10
	29. Overcoming Barriers		(20)	9
	30. Participation Lapses		(14)	7
	31. Social Interaction		(34)	11
Higher Order Processes				
	32. Change		(65)	12
		33. Situational	(15)	10
		34. Perceptual	(6)	4
		35. Attitudinal	(13)	7
		36. Behavioural	(10)	9
		37. Physical	(21)	11
	38. Health Professional Facilitated Support		(53)	12
	39. Problem Recognition		(17)	12
	40. Socially Facilitated Support		(58)	12
Contextual Information				
	41. Environment		(38)	11
Barriers				
	42. Deteriorated Physical Health		(6)	5
	43. Environmental		(7)	5
	44. Time		(19)	9

7.3.2 Details of Continued Conceptual Development

7.3.2.1 Identifying a Problem Recognition Process

When I reviewed the emergent findings from the first phase, I realised that behaviour change is something that occurs over *time* and although I had identified *time* as a dimension (i.e. created nodes to allow me to code for different *time* periods), I had not explored it in any detail. This was potentially due to my initial focus on behavioural outcomes (i.e. maintenance stability) which led me to identify both cognitions and behavioural actions associated with those outcomes. Consequently, there was a need for me to consider how these were developed over *time* to understand how people actually change their PA habits.

While conducting and coding the second phase of interviews, I realised that all participants described a process which I have labelled *problem recognition*, whereby a problem was identified (usually a personal physical or mental health issue), which could be addressed by an increase in PA. It was this process of *problem recognition* that appeared to influence early behavioural *intentions*, subsequent behavioural *changes* and helped me to understand each participant's initial motivation. To further explore this process, *problem recognition* was created as a node and the data was coded for relevant references to this. Inspection of the data coded at *problem recognition* revealed that it appeared to occur based on the influence of various sources. I identified these as: *verbal encouragement* from significant others or health professionals, *information or advice* provided by health professionals or other sources (i.e. details on risk, individual prognoses & treatment options), *experiences of poor health* and health related *vicarious experiences*. The extract from one of the interview transcripts (LW-2) overleaf, represents text coded at *problem recognition* and highlights some of the sources described above.

Interviewer - "I'd like you to explain why you were originally referred to the proactive scheme in the first place?"

LW - "Yes, my doctor who has changed now.....well I told her I was confused because I had osteoporosis and then I got osteoarthritis sadly and I also had a back injury. So I kept having these periods where one minute I could walk, and I've always walked, and I could ride my bike and then the next minute I would have great surges where it would all kick in and I couldn't do anything. Also it seemed to me that certain things I did probably aggravated it and I wasn't sure what was getting me into these sticking moments and what was keeping me moving or whether I had any control over it. My husband who does exercise, he goes quite a lot, said oh if you just go to the Gym. But of course I was a bit frightened thinking that if I go to the gym I might do the wrong thing and bla bla bla."

Experiences of poor health

Verbal encouragement

Interviewer - "Ok, so you're husband hinted at you and then you went to GP for advice to see what sort of exercises might be appropriate, does that sound right?"

LW - "That's right, I mean what they do is they say oh you've got osteoporosis and you get checked up on an annual basis and they say it's got older, ... and the more it gets older the more immobile I'll become.."

Information about prognosis / treatment options

Interviewer - "Right ok"

LW - "...and then you start to think Oh my god this it, you're not going to be mobile again. So I was given the advice that there was this doctors referral scheme to the gym, which could improve things."

(Source: LW-2)

Due to the fact that I had conceptualised *problem recognition* as a process, an emergent question at that stage was: how do the above sources ultimately influence PA participation? To explore this, text coded at *problem recognition* was re-examined and comparisons were made between each individual account. This revealed that in response to the sources highlighted above, individuals described a number of realisations or made statements about their health and their perceptions of PA participation. These statements appeared to represent *beliefs* they had developed regarding their current health status or future health prognosis, the implications of these and the potential benefits of PA participation. These beliefs and attitudes were often accompanied by a statement of *intention* regarding PA participation. See Table 7.7 for a selection of relevant raw data segments and associated observations.

Table 7.7 Sample Quotes Coded at "Problem Recognition"

Segment of Quote Coded at "Problem Recognition"	Associated Observations	Source
"Well because I have always had problems with my back, I know it's in a bad way and when I used to go to physio it was always suggested that physical activity would help me to control this. So I approached my GP about ProActive and when the scheme was offered to me I decided to go for it."	Health Related Beliefs	JM (3)
"I was about 36 at the time and I just became a bit aware of my overall health, with two young children to support obviously. I wasn't really physically fit at all. I think with campaigns that were running on the television and the heart foundation thing, I became a little anxious about myself. Eventually my doctor said "I recommend putting you on a... well going to the gym to help with this" so I thought it sounds like a good idea, I'll give it a go."	PA Participation Related Beliefs	MB (5)
"When I had my children I put on a lot of weight and I was told I'm clinically obese. So he referred me to the gym to try and get me more active to help with my health problems."	Statement of Intention	TW (8)

Control

Because, the sample of participants for this study represented successful changers, all developed *beliefs* that resulted in them initiating behavioural changes (i.e. they began to participate in a programme of PA as part of ProActive). However, by making comparisons between the individual accounts of PA initiation, I realised that for some participants, external sources such as the referring medical professional, played a more significant role than for others. For example, some individuals approached their doctor with the belief that they needed to be more physically active and simply wanted to know the options available to them (e.g. first quote in Table 7.7). Others responded to information given to them by the medical professionals by expressing a desire to be more physically active (e.g. second quote in Table 7.7). Finally, some participants made no statement of intent and simply described accepting instructions from medical professionals that they needed to take part in a PA programme (e.g. final quote in Table 7.7). Therefore, for some individuals the beliefs described represented a conscious attitudinal change, whereas for others they merely represented an acceptance of an external sources (usually a medical professional) opinion. Based on this observation I identified *control* (i.e. the extent to which behaviours are under volitional control) as a potentially important variable. Using a coding query I was able to identify which participants described a *high* level of personal *control* over their PA initiation, and which described being *less* in *control* at this *time*. I was then able to make comparisons between these groups. This revealed that where people described *experiences of poor*

health, they appeared more likely to take a *controlling* approach compared to those who just cited *vicarious experiences* or the *provision of information* as sources of *problem recognition*.

Based on the above evidence, the start of the change process (*problem recognition*) involved a number of sources of information being interpreted, resulting in the development of *beliefs* regarding personal health and PA participation. These *beliefs* then translated into *intentions* to initiate PA participation and subsequently into the actual initiation of PA. However, the nature of these *intentions* varied across individuals based on the extent to which they were internally controlled/regulated (See Figure 7.5).

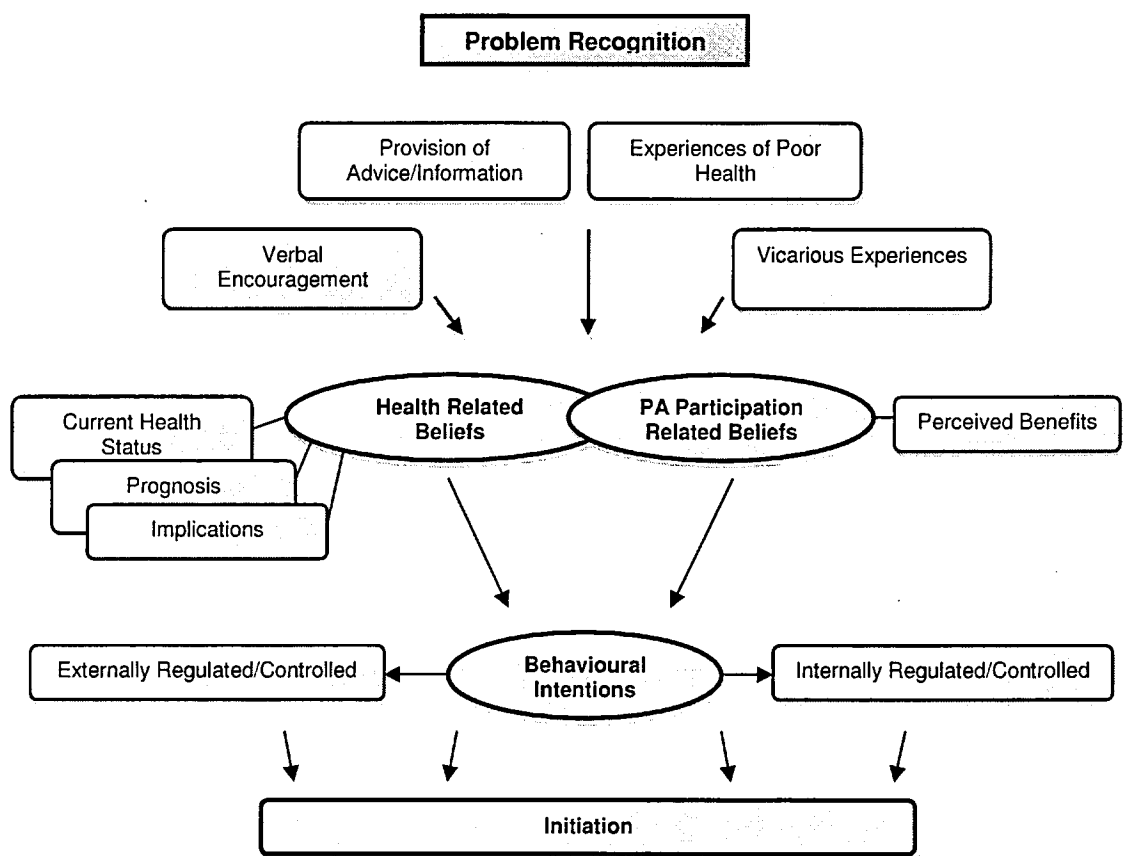


Figure 7.5 "Problem Recognition" Process

7.3.2.2 Understanding Continued Participation

Having identified a process that led to the participants initiating PA participation, I was then interested in how this developed to the point where people were achieving long-term behavioural changes. Although a number of *cognitive* and *behavioural* characteristics that appeared to be associated with long-term change had been identified (See Figure 7.4), the relevance of these was not always clear. Although all participants were recruited on the grounds that they had successfully completed the ProActive

scheme and had subsequently made significant, long-term, changes to their PA participation habits, considerable variation could be observed when comparisons were made between cases for participation stability over *time*. This was achieved by using a matrix coding query (See Chapter 6, section 6.5) to identify lapses in participation at different *time* periods for each participant (See Figure 7.6 for results of matrix coding query).

Stability over time			
		A : During Scheme Lapses	B : Post Scheme Lapses
1 : Interview 1(SD)		0	0
2 : Interview 10 (PH)		0	1
3 : Interview 11 (JS)		0	2
4 : Interview 12 (JV)		0	0
5 : interview 2(LW)		0	6
6 : Interview 3 (JM)		0	1
7 : Interview 4 (RP)		0	0
8 : interview 5 (MB)		0	1
9 : Interview 6 (NS)		0	2
10 : Interview 7 (EH)		0	2
11 : Interview 8 (TW)		0	0
12 : Interview 9 (NW)		0	1

* The numbers in each cell represent the amount of references made to participation lapses in each interview.

Figure 7.6 Matrix Coding Query Results for "Stability over Time"

Query results revealed that *during* the ProActive scheme, no *participation lapses* were observed. However within the data coded at *post scheme*, a number of references were made to *participation lapses*. Closer inspection of the individual segments of data revealed that these references usually described multiple *participation lapses*, and comparisons between participants supported earlier observations regarding the varying degrees of stability across participants. After exploring the relevant data (coded at *post scheme participation lapses*) for each participant, I identified three descriptive categories that appeared to account for each interviewee's participation habits since completing ProActive. The first of these accounted for those who had demonstrated stable enduring participation since completion of the scheme and appeared to find ongoing participation relatively *effortless*. The second accounted for participants who did encounter *barriers* and as a consequence experienced occasional *participation lapses*, but always found ways to overcome them. Finally, one participant described continued participation as a much less stable endeavour, involving frequent often

prolonged *participation lapses* and a *high* level of *effort* (See Figure 7.7 for a graphical summary).

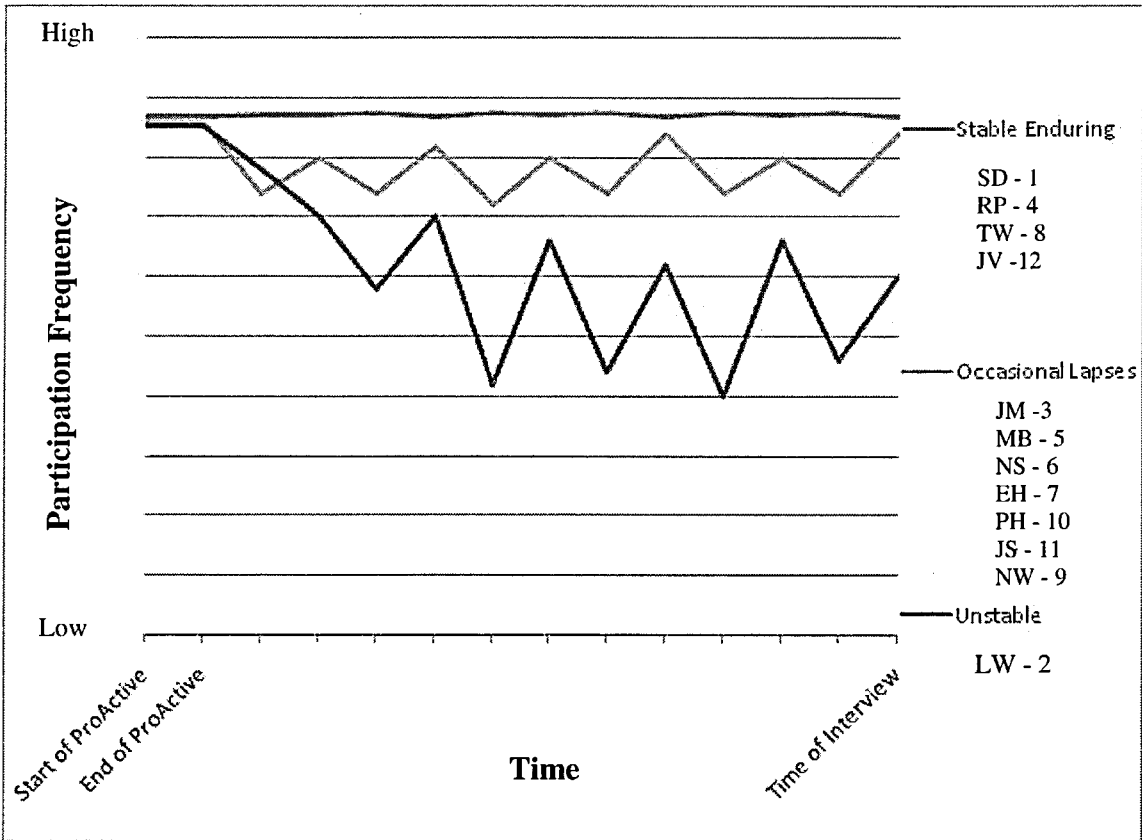


Figure 7.7 An Overview of the Differing Degrees of "Stability"

As a consequence of the above observations, I realised the importance of identifying *change* as a concept which needed to be explored. Consequently, a node was created called *change* to reference all of the types of *change* (behavioural and/or psychological) described in the data. When all the data coded at *change* was reviewed, I observed that *change* occurs on a number of different levels and *time* periods. Specifically, I identified five different levels or categories of *change*. These were: *situational changes*, *perceptual changes*, *attitudinal changes*, *behavioural changes* and *physical changes*. A descriptive overview of each of these is presented in Figure 7.8.

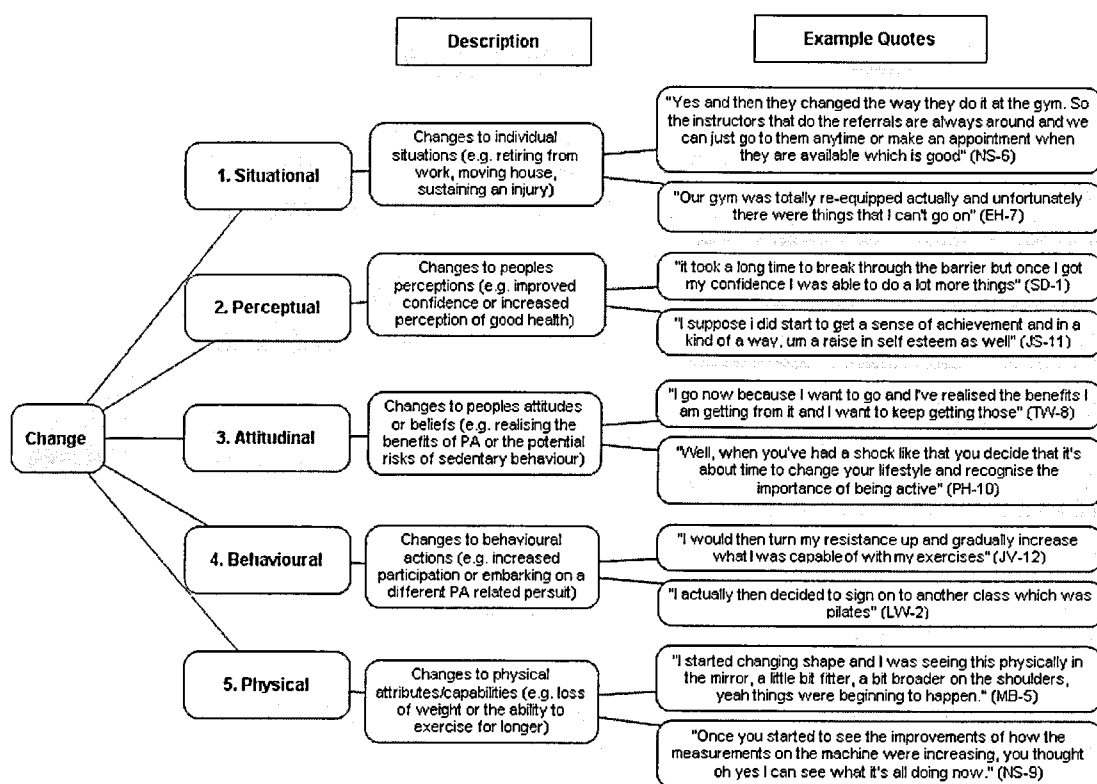


Figure 7.8 Observed Types or Levels of Change

Comparisons between participants revealed that the *changes* described in Figure 7.8 occurred at different *times* and frequencies for different individuals. Therefore, an emergent question at this stage was: despite the differences observed, why were all these people still managing to make significant long-term changes to their PA habits? To gain further insight into this, I began to explore the segments of data coded at the different types of *changes* identified.

When I explored data references coded at *situational changes*, *control* emerged as a concept which differentiated between different types of *situational changes*. Specifically, some of the *situational changes* identified, were described as being a result of personal decisions and efforts of the participant (*internal control*), whereas others were guided by *external* sources or were the result of *external* circumstances. After re-coding the data for instances of *internal* and *external control*, I was then able to perform a coding query, which allowed me to compare *internally* and *externally* controlled *change*. Inspection of the query results confirmed that both *behavioural* and *situational changes* could be either *internally* or *externally controlled*. Where *situational changes* were described as being *externally controlled*, this was often perceived as being a *barrier* to PA participation. This led to the identification of various types of *barriers*

which people described. Table 7.8 demonstrates examples of the different *barriers* identified.

Table 7.8 Sample Quotes Coded at "Situational Change" and Different "Barriers"

Segment of Quote Coded at "Situational Change"	Associated Type of "Barrier"	Source
"Recently our working days have changed. Because my wife gets up at five in the morning now and when I get home at six the last thing we really want is to go out, so we had to get back into the habit again."	Time	NS (6)
"The other thing what happened was I had a problem with one hand which meant that a lot of the exercises became quite painful."	Physical Health	JV (12)
"Our group environment was really quite friendly. Then one of them died and a couple stopped attending and suddenly I was travelling this distance to go to the gym but there wasn't somebody who was either there to keep it interesting or somebody there that you could go and have a coffee with afterwards, which is what often happened with the group."	Environmental	LW (2)

Further comparisons between *internally* and *externally* controlled *change* revealed that *behavioural changes* appeared to differ based on the extent to which they were *internally* or *externally* controlled. Where *behavioural changes* were described as being *externally controlled*, coding stripes revealed that this only occurred at the early stages of PA adoption (i.e. *during* the referral scheme) or alongside *situational changes* (i.e. in response to a situational occurrence outside of the individuals *control*). Therefore, this suggested that long term changers might possess or develop a sense that they are in *control* of their own actions and any lapses in participation occur as a result of uncontrollable *external* events. Consequently, an emergent question at this stage was how do people develop that sense of being in *control* and demonstrate actions that are under *internal control*? In attempts to gain further insight into this, I re-examined a number of the previously identified concepts, which had re-emerged in the more recent interviews and appeared to be linked to the *change* processes described above.

7.3.2.3 Further Exploration of Competence Related Concepts and Outcome Beliefs

As described in section 2.2 of this chapter, a number of concepts that seemed to be related to competence were identified. These included *perceptions of competence*, *sense of achievement* and *self-confidence*. Additional references made to these concepts presented me with a greater amount of relevant data, allowing me to explore them further. I was led to re-examine these concepts because data coded to *perceptual changes*, made frequent reference to these competence related concepts. This suggested that changes in individuals' *perceptions of competence*, brought about through a *sense of*

achievement, could be an important characteristic of the PA behaviour change process. Consistent with my earlier observations, *high perceptions of competence* did seem to be associated with a *sense of achievement* and expressions of *willing participation*, whereas *low perceptions of competence* were associated with negative affective responses (e.g. participation related anxiety, disinterest) and expressions of *reluctance to participate*. Therefore, *perceptions of competence* emerged as a potentially important determinant of people's PA participation.

In response to these observations, I decided to incorporate some potentially relevant literature into my analysis to encourage further exploration of the competence based concepts I had identified. Specifically, I realised that *self-efficacy* theory (Bandura, 1977; described in Chapter 2, Section 3.3) might offer some insight into to role of competence in the PA behaviour change process. *Self-efficacy* is defined as "the belief in ones capabilities to organise and execute the courses of action required to manage prospective situations" (Bandura, 1995: p.2) and it has been shown to be a possible determinant of PA maintenance (McAuley et al., 2003). Therefore, the *perceptions of competence* identified from the data might actually be representative of people's *self-efficacy*. In addition to this, an important source of efficacy related beliefs has been identified as performance accomplishments (Bandura, 1995), which are arguably similar to the *sense of achievement* concept. Consequently, I was interested to explore whether increases in *self-efficacy* were occurring and whether they could explain the effects that *perceptions of competence* were having on PA participation.

To explore the above question, data coded at *perceptions of competence* and its wider context was re-examined, to identify whether people went on to talk about confidence in their own ability to make changes to their PA participation or continue with an increased level of PA participation (*self-efficacy*). This process eventually resulted in me making a clear distinction between *self-efficacy* related *beliefs* (e.g. beliefs regarding a person's ability to change and maintain) and *outcome* related *beliefs* (e.g. beliefs regarding the health related benefits of PA). These analytical observations were made because when I explored the relevant data, evidence emerged to suggest that *perceptions of competence* did go on to inform *self-efficacy* related *beliefs*. However, I also observed that they appeared to inform *outcome* related *beliefs* as well. Consequently, I realised that some of the data coded at *perceptions of competence* was actually more closely a reflection on peoples *health related perceptions*, and it was these that were informing *outcome* related *beliefs* (see Table 7.9).

Table 7.9 Example Quotes Coded at and around "Perceptions of Competence"

Segments of Data Coded at and around "Perceptions of Competence"	Associated Observations	Source
"As I improved at the exercises, I suppose it was a sense of achievement and in a kind of a way, um a raise in self esteem as well. I could see that it was benefitting me physically, not only for my bad back but for the way I was looking as well. So this kept me motivated to keep going"	Health Related Perceptions & Outcome Related Beliefs	JS (11)
"I was sort of thinking, well I can't be that bad if I can go down there and do 20 minutes on the cross trainer then I'm not as unfit as I thought I was, and the confidence it was giving me, I knew I could stick with it."	Competence Related Perceptions & Self-Efficacy Related Beliefs	MB (5)

The above observations seemed to confirm earlier findings regarding the fact that *beliefs* are an important determinant of ongoing PA participation. Further to this, two distinct types of beliefs/attitudes had emerged from the data (*outcome related* & *self-efficacy* related). Consequently, a number of questions emerged regarding these two theoretical constructs, because it was not clear exactly how and when these different *beliefs* impacted on peoples PA participation. Specifically, both *beliefs* relating to confidence in a person's own ability to change/maintain and *beliefs* relating to PA *outcomes* (i.e. *health benefits*) had been identified as important determinants of PA participation. To make comparisons between these, I changed my node structure accordingly (See Table 7.6) and re-coded all of the data coded at *self-confidence* to either *self-efficacy* related *beliefs* or *outcome* related *beliefs*. After comparisons were made between these two nodes, some potential sources which could lead to the development of people's *beliefs* were identified. These represented different types of *perceptions* and the *sources* of information from which they appeared to be derived (See Table 7.6). There was also evidence to suggest that *outcome* related *beliefs* were more closely associated with a person's behavioural *intentions*, whereas *efficacy* related *beliefs* were more closely associated with actual behavioural responses. For example, the data coded to the *outcome beliefs* node revealed that when people referred to these types of beliefs, this was often followed by statements which appeared to reflect their PA participation *intentions*. However, *self-efficacy beliefs* appeared to be more action orientated because they were referring to peoples perceptions of their own abilities to change or maintain their PA related behaviour. For this reason, *self-efficacy beliefs* appeared to be closely related to people's perceptions of potential *barriers* because *high* perceived *barriers* appeared to be associated with *low self-efficacy* (i.e. a lack of confidence that these can be overcome to bring about change or continued participation).

7.3.2.4 Exploring Socially Orientated Concepts

While I was examining the data coded at *outcome related beliefs*, the coding stripes function revealed that as well as referring to *competence* and *health* related outcomes, people also described a number *socially* orientated outcomes. Specifically, *social interaction* emerged as a potentially important concept for many people, suggesting that *socially orientated* outcomes might also be important. Previous analytical procedures and observations had suggested that one of these *socially orientated* outcomes was being able to *relate to others* in the PA environment. As well as this, during the collection and analysis of additional interview data, I also identified the concepts: *experiencing a shared sense of purpose* and *feeling understood* as related *socially orientated* outcomes.

In response to these observations, I decided to incorporate some further potentially relevant literature into my analysis to encourage exploration of these *socially orientated* concepts. Specifically, I observed that the concept relatedness identified within self-determination theory (SDT: Deci & Ryan, 1985; Ryan & Deci, 2000) could offer some insight into the role of these different *socially orientated* outcomes. Within SDT, relatedness is identified as one of three fundamental psychological needs and it refers to a sense of belongingness and connectedness with others (Hagger & Chatzisarantis, 2007). Consequently, I realised that the different outcomes I had identified all seem to describe either a sense of belongingness or connectedness. To confirm this observation I set up a coding query to view all the data coded at the three *socially orientated* outcomes. I was then able to map coding stripes onto the results of this query and see that there was considerable overlap between these in terms of the raw data segments that were coded at them. Based on this it appeared that these were closely related to one another, possibly because they all represented the concept relatedness. Consequently, at this stage of the analysis *socially orientated* beliefs had emerged as a potentially important dimension of PA related *outcome beliefs*, which appeared to be closely linked to behavioural *intentions*.

7.3.3 A Descriptive Model of Change

By continuing to describe the ongoing evolving analytical processes, this section has demonstrated considerable additional insight into the studied phenomenon. Figure 7.9 summarises how these developments have led to a more comprehensive but still predominantly descriptive account of successful PA behaviour change. Additional analytical procedures confirmed the existence of many of the previously identified

potential determinants of change and a number of new ones. Also, by attempting to focus on PA behaviour change as a process, I was able to contextualise many of these and build a more process orientated account of change. Specifically, by identifying and making comparisons between the changes described in the data, I was able to differentiate between levels of change and identify the potential significance of these.

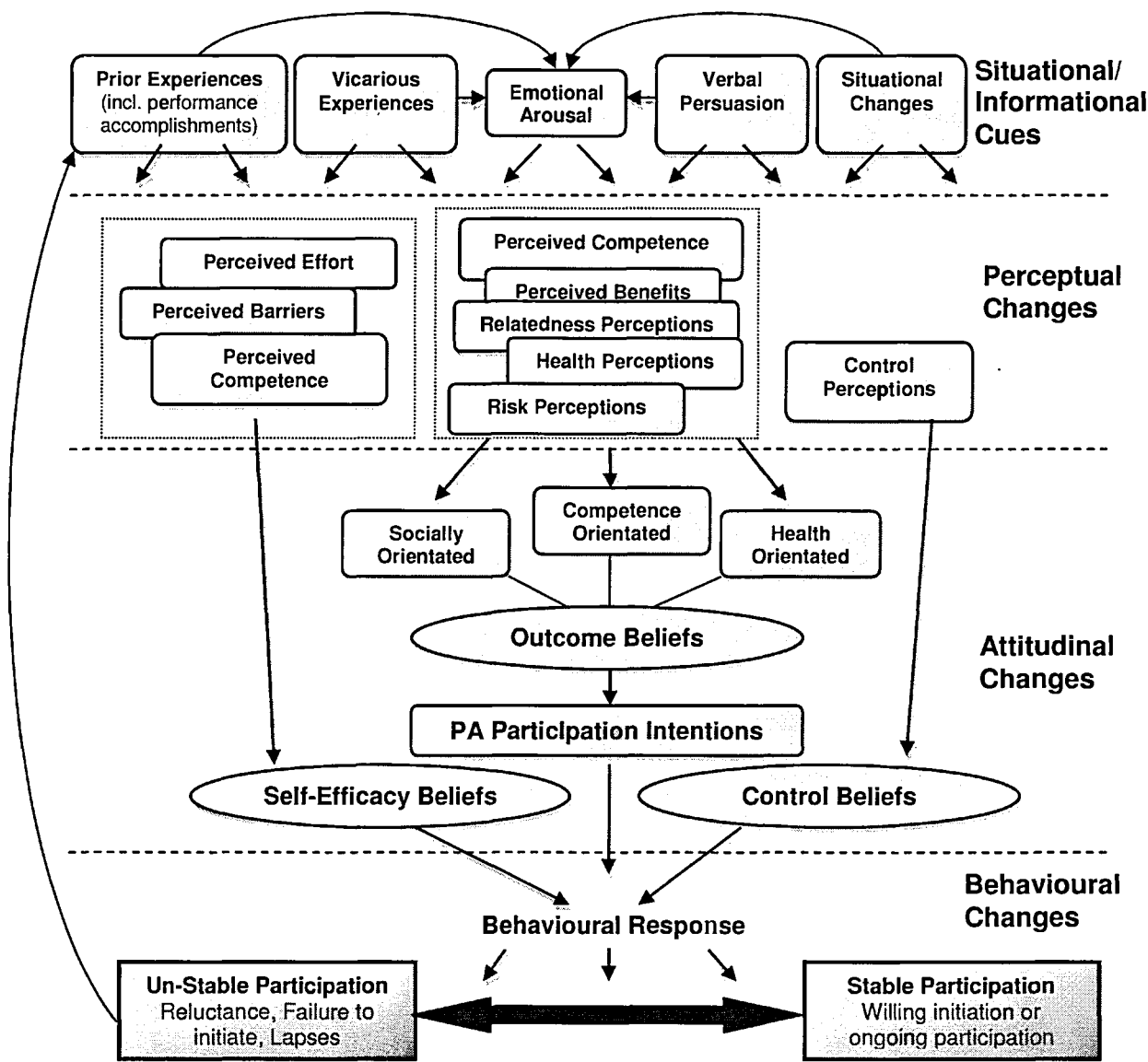


Figure 7.9 A Descriptive Model of PA Behaviour Change and Maintenance

Figure 7.9 demonstrates that PA behaviour change is represented by both cognitive and behavioural responses to a number of situation specific sources of information. These are interpreted and lead to the development of a number of different types of beliefs or attitudes. Among these are *outcome* related *beliefs*, which seem to fit into the following three categories: *health orientated* (i.e. beliefs about how PA participation might impact on a persons health), *competence orientated* (i.e. beliefs

about how PA participation might impact on a person's sense of competence) or *socially orientated* (i.e. beliefs about how PA participation might impact on one's sense of relatedness). These *outcome beliefs* appeared to directly impact on a person's PA related behavioural *intentions*. For example, the extent to which a person believed that they needed to be more physically active, based on its associated health, competence or social related outcomes, reflected the strength of their behavioural intentions. The interview data also suggested that *self-efficacy* related *beliefs* were also developed through similar sources of influence. These appeared to facilitate the transformation of *intentions* into actions because they represented an individual's confidence in their ability to participate, based on their own capabilities and the role of external forces of influence (e.g. barriers). Finally, *control* related *beliefs* were also identified due to observed variations between individual cases at different time periods. The significance of these was not fully established, but the data did suggest that they could be an important determinant of participation stability.

By examining PA initiation as a separate process and then subsequently comparing it with data linked to continued participation, I observed that the processes depicted in Figure 7.9 can be applied to both initiation and continued participation. However, although the sources of information identified were evident for both initiation and continued participation, the relative influence of these might differ between these two phases. For example, *verbal persuasion* from external sources was highly prevalent at the initiation stage, whereas outcome related information (i.e. *prior experience* related) appeared more important as a source of information for ongoing participation. As a result, initiation appeared more externally controlled compared to continued participation for most individuals. Finally, once again considerable variation was observed in the behavioural and cognitive responses described. For example, instances of willing initiation and stable enduring PA participation were observed alongside instances of reluctant initiation and unstable ongoing participation.

7.4 Theoretical Development: Moving Beyond a Descriptive Account

Although the previous section of this chapter demonstrates a number of insights into the phenomenon of successful PA behaviour change, Figure 7.9 should not be viewed as a comprehensive theoretical account of PA behaviour change because a number of unanswered questions still remain. For example:

- Why do people demonstrate varying levels of maintenance stability?

- Why do people place differing levels of emphasis on the different types of *outcome beliefs* identified?
- Why do the situational/informational cues depicted in Figure 7.9 often lead to *emotional arousal* or affective responses?

The above questions demonstrate that at this stage of the GTM process my level of understanding was still largely descriptive and lacked theoretical depth. Specifically, I had identified a number of observed phenomena linked to successful PA behaviour change; but had not always provided an explanation as to why such observations were occurring. As explained in Chapter 5 (Section 3.1), theoretical density represents a key characteristic of any grounded theory (Corbin & Strauss, 2008; Charmaz, 2006; Glaser & Strauss, 1967; Glaser, 1978). Consequently, it was important that the subsequent sampling and analytical procedures conducted were aimed at advancing theoretical development by addressing any unanswered emergent questions. Therefore, the following section describes the procedures which helped the analysis move beyond a descriptive account into the realms of a substantive explanatory model.

7.4.1 Theoretical Development

As explained in Chapter 6 (Section 6.4), in order for the analysis to remain open to new emergent possibilities, initial coding procedures were conducted on all interview transcripts. However as the GTM process developed, changes to the node structure became less common because fewer new descriptive codes were identified. As a result, this section of the chapter does not present the node structure, but instead focuses on describing how the previous nodes were examined in more detail to advance theoretical development. Where new nodes were created during this phase of the GTM process, these are still identified and described in the text (for an overview of my final NVivo node structure, see Appendix G).

7.4.1.1 Conscious Valuing

To gain a better understanding into the individual differences observed with regards to people's participation habits, I used the attribute function of NVivo (See Chapter 6, Section 6.3) to make comparisons between different states of stability. This involved categorising each participant based on the observed level of stability they demonstrated; then using a coding query, exploring all the data coded at the different levels of stability. This procedure led to the identification of a concept labelled *conscious valuing*, which I created to represent instances in the data where participants

expressed that their PA participation, or some aspect of it, was of personal importance to them (See Table 7.10 for examples). These instances appeared to be more common in data sources linked to more *willing*, stable participation, suggesting that *conscious valuing* could be an important characteristic of stable maintenance.

Table 7.10 Sample Quotes Coded at "Conscious Valuing"

Segments of data coded at "Conscious Valuing"	Source
"Um, I think it is really important that it is time for me where I'm just away for an hour. I have a very stressful job now and it is relaxation time for me. Or when I'm punching the air it's a relief of stress and it is very uplifting, very jumping around and kicking, it sounds really silly when I'm saying it but I need it. It makes me feel really good in myself"	JS (11)
"It has become very important to me because I have a programme that is specifically set up to help me with my problems as well, and I'm that much more positive about it because I know its doing me good where I need it to do me good if you see what I mean?"	TW (8)
"Yes, really, so I suppose it was all stuff that I did for myself. You know, I went to the gym, I joined the ramblers and all these things, took up dancing, and they were all things which became important to me and helped me through things in life"	KY (13)
"If I don't continue to be physically active I risk my back getting worse and then I can't do the things that I like doing. You know, if I didn't do so much physical exercise, if I didn't do Pilates and make sure my lumbar joints are moving, then my back hurts, so it's very important"	MM (14)

Where interviewees described *conscious valuing* in relation to their PA participation, this appeared to be for a range of different reasons. For example, the quotes included in Table 7.10 demonstrate that for some people PA provides relief from the stresses of everyday life and for others it provides a tangible solution to their health problems. Despite these differences, the individuals involved are ultimately describing something that is highly important to them. Therefore at this stage of the GTM process, the data had revealed that by understanding the things which people attribute importance to in their lives (i.e. the things they value), it might be possible to gain further insight into stable, enduring change.

In an attempt to gain further insight into the role of *conscious valuing*, I made comparisons between the different references to it. After inspecting and comparing each reference closely, I observed that although participants described valuing a number of different things, many similarities were evident between each case. Consequently, from the raw data coded at *conscious valuing*, I was able to identify a list of all of the different factors that were highlighted as being of personal importance (i.e. consciously valued) to the participants (See Table 7.11, 1st column). By making comparisons between these and by exploring the relevant raw data, the following more general *values* commonly described by individuals were identified (Table 7.11).

Table 7.11 "Values" Identified From the Raw Data

Items of Value	General Value Categories	Description	Referred to by How Many Sources?
<ul style="list-style-type: none">• A sense of competence• Performing well compared to others	Achievement Related Competence	The importance of experiencing personal success/competence.	7
<ul style="list-style-type: none">• Feeling young• Looking good	Appearance Related Competence	The importance of looking physically good to others.	3
<ul style="list-style-type: none">• Being healthy• Being Fit• Being physically able• Avoiding poor health	Functional Health Related Competence	The importance of being physically capable of embarking on life tasks (i.e. being fit enough to work).	10
<ul style="list-style-type: none">• A sense of purpose• Having goals• Having direction	Direction and Purpose	The importance of having goals to strive for in life.	4
<ul style="list-style-type: none">• Feeling in control of something	Control	The importance of feeling in control of ones actions.	9
<ul style="list-style-type: none">• Escaping from stress• Having something for oneself	Escaping from Stress and Toil	The importance of being able to get away from or cope with stressful situations in life.	6
<ul style="list-style-type: none">• Friendship• Social contact with opposite sex• Companionship• Social contact with family and friends	Social Connectivity	The importance of interpersonal relations.	9

7.4.1.2 Values and Core Beliefs

Through identifying the different values presented in Table 7.11, it had emerged that a person's orientation towards life, in terms of what is important to them, might represent an important underlying mechanism for their PA related behaviour. Comparisons between cases revealed that while participants often expressed the *values* identified in the above list, the relative importance placed on these differed for each person. However, it was unclear exactly how these underlying values might impact on peoples PA related behaviour.

By making further comparisons between the *values* identified in Table 7.11 and some of the emergent themes identified earlier in the analysis, I was able to gain further insight into the role of peoples underlying *values*. This revealed a possible link between

people's *outcome related beliefs/attitudes* and their *values*. Specifically, the descriptive account presented in Table 7.9 identified three different types of *outcome belief* from the data: those that were *health orientated* (i.e. beliefs about how PA participation might impact on a persons health), those that were *competence orientated* (i.e. beliefs about how PA participation might impact on a persons sense of competence) and those that were *socially orientated* (i.e. beliefs about how PA participation might impact on ones interpersonal relationships). I observed that all of these can be linked to at least one of the *values* identified in Table 7.11. For example, *health orientated outcome beliefs* (e.g. being physically active will make me fitter), could be representative of appearance or functional health related *values* (i.e. to be fitter can be perceived as looking better or being more capable, or both). Alternatively, *socially orientated outcome beliefs* (e.g. going to the gym will involve meeting new people) appear to be linked to *values* that relate to social connectivity. Therefore, peoples underlying *values* might explain why they are orientated to specific outcomes.

To explore this suggestion, I incorporated additional questioning into subsequent interviews to explore peoples underlying *values*, and subsequently made comparisons between these and people's *beliefs/attitudes* directed at PA participation. This involved using the query functions of NVivo to explore the data coded at both underlying *values* and the different *outcome beliefs* described. Table 7.12 highlights some sample quotes from the query results, demonstrating that peoples *outcome beliefs* are often representative of the underlying *values* they express.

Table 7.12 Sample Quotes Demonstrating the Relationship between "Outcome Beliefs" and "Values"

Source	Data Representative of "Outcome Beliefs"	Data Representative of Underlying "Value(s)"
SD (1)	"Through swimming I am doing something for me, which is nice."	"I used to fantasize about starting the day by getting into the swimming pool. That was where I wanted to be, rather than driving round West Somerset in the dark."
JS (11)	"I know when I'm punching the air during combat aerobics, that it's a relief of stress and it is very uplifting"	"I think it is really important that it is time for me where I'm just away for an hour. I have a very stressful job now and need relaxation time for me."
TW (8)	"I do know the benefits, and now they regularly do a fitness tests so I can see that my fitness improves."	"Having had a taste of how difficult it is when you've got bad joints or whatever, how hard it is to get around, to get up the stairs and do things with the kids. I don't want to get to stage where I physically can't do things that I want to do"
MM (14)	"I'm certainly convinced, well I know in fact, that if I don't keep going with the exercises, then my lower back will give out"	"When I was younger, I played county hockey, I swam, I played tennis and squash, so I have no interest in having a stiff and uncomfortable back. If my back gets worse then I can't do the things that I like doing."
EH (7)	"I suppose because I know that it's [going to the gym] one of the things that keeps me going"	"I've just got to keep myself going as long as I possibly can. I want to basically keep doing things. I get very frustrated now that I have got a grandchild and I've started getting more back problems; because I am reaching down to pick her up."
WA (17)	"It gave me something to aim for [going to the gym], it gave me something to um, commit to if you like"	"Having depression it is very important to have something to make you get out of bed in the mornings"
ST (16)	"At least by persevering with the gym and the exercise I know I can at least get myself to a level that I know I am comfortable with."	"I was, um, a tri-athlete before the accident and being a fire-fighter I'm used to and thrive on competitive environments and getting good at something"

Despite the evidence presented above, further comparisons between cases revealed that the relationship between underlying *values* and PA related *attitudes/beliefs* was more positive for some individuals than others. Specifically, I observed that in some cases the *values* people described were closely and positively linked to *outcome attitudes/beliefs* (See examples in Table 7.12), whereas in others, the PA *outcome attitudes/beliefs* described were less positively linked to their *values*. For example, a number of participants expressed *values* which potentially related well with PA outcomes, but their *outcome beliefs* were concerned with negative views on PA environments (See example overleaf):

"It's because it's so important for me to be physically fitter and I know I need to get weight off. And if I don't get weight off obviously I know that with osteoporosis the arthritis can come on."

"I don't like being on display and well I think gyms are sweaty and smelly places, that's another thing from the female perspective I suppose."

(LW - 2)

When I explored the data further, I observed that those who demonstrated greater congruence between their underlying *values* and their PA related *attitudes/outcome beliefs* (i.e. a more positive association), also demonstrated greater stability in their ongoing PA participation. Consequently, at this stage of the GTM process it had emerged that, if people believed that their PA participation was consistent with their underlying *values*, they might be more likely to demonstrate stable, ongoing participation. However, it was not clear how this observed *value* congruence occurs and why some people demonstrated it to a greater extent than others.

To investigate this, my ongoing theoretical sampling involved asking about participants underlying *values* and the relative importance that they ascribed to them. Responses to this line of questioning revealed that although people valued multiple things, they explained that some of these were of greater importance to them than others. Consequently, I observed that not only do people possess different underlying *values* (See Table 7.11), but that these appear to be organised based on their relative importance for that person. Therefore, while all people appear to possess a number of underlying *values*, the extent to which these are congruent with their *beliefs* about PA participation, might vary as a function of the importance ascribed to them. As a result, I decided to explore the potential implications of a lack of *value* congruence.

Ongoing theoretical sampling targeted at exploring peoples underlying *values* and the exploration of potentially relevant previous emergent themes occurred. I observed that when people described feelings of reluctance towards PA participation, there was often evidence that the situation they were presented with either directly conflicted with their underlying *values* (i.e. presented a barrier) or caused *values* to conflict with one another based on their relative importance for that person (See example on previous page).

7.4.2 Introducing a Theoretical Layer

By continuing to describe the ongoing evolving analytical processes which occurred, this section has demonstrated that after conducting 21 interviews, considerable additional insight was gained into a number of the unanswered emergent questions. Figure 7.10 summarises this further insight by presenting a model, which provides theoretical underpinnings for the previously identified more descriptive observations (Figure 7.9). Specifically, additional theoretical sampling and analytical procedures revealed that peoples underlying *values* might offer further explanation into the dynamics of people's PA participation habits. Figure 7.10 demonstrates this by presenting an underlying *value* structure where people organise their *values* or core beliefs hierarchically, based on their relative importance. These *values* ultimately represent different people's orientations to the situations they are presented with. Therefore, as people encounter situations which lead them to develop *beliefs/attitudes* about PA participation, which they ultimately act on, their underlying *values* interact with those situations to determine the nature of those *beliefs* and their associated PA related outcomes.

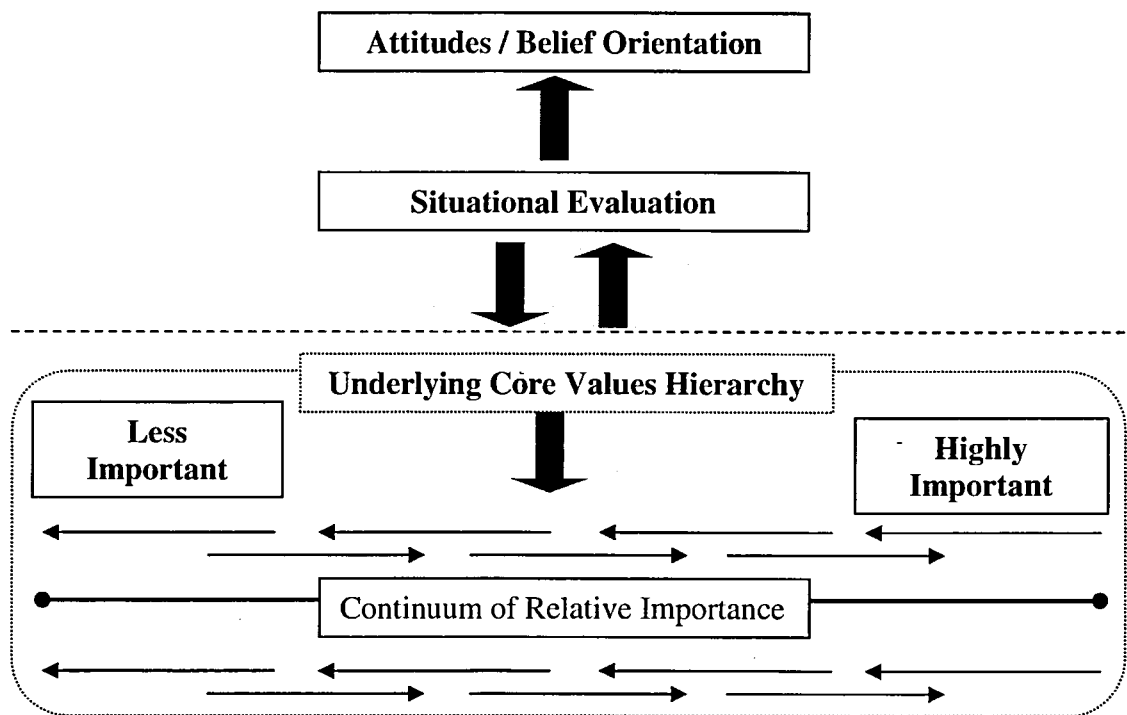


Figure 7.10 Underlying Value Structure

7.5 Identification of Core Categories

Throughout the course of this GTM based study, the analytical observations and procedures have been targeted at developing an explanatory account of successful, long-term PA behaviour change. First, initial concepts and categories, which covered a wide range of empirical observations, were identified from relevant data sources (Section 2 of this chapter). These were then developed through ongoing sampling and a range of comparative procedures, designed to facilitate theoretical development (Sections 3 & 4 of this chapter). The outcome of this process is an increasingly complex representation of the PA behaviour change process, comprised of emergent themes, categories and their associated relationships. As explained in Chapter 5, an important characteristic of any grounded theory is theoretical density. This is achieved by specifying clear links between individual categories, subcategories and the larger core category, allowing for hypotheses to be generated regarding the studied phenomenon (Corbin & Strauss, 2008; Charmaz, 2006; Glaser & Strauss, 1967).

This level of theoretical depth can be observed in the current emergent understanding by looking at the overall structure of the concepts and categories identified. First, the descriptive layer of the model (Table 7.9) identifies the cognitive processes, which appear to underpin PA related behavioural actions. These are representative of three higher order categories or levels of change. The first level includes concepts which represent situational/informational cues. The interpretation of this information is then accounted for by the different perceptual and emotional changes (perceptual & emotional level) identified and the result of this process is the development of different beliefs and attitudes (belief/attitudinal level) regarding PA participation. Ultimately, the relative nature of these different beliefs dictates peoples PA related behavioural actions (behavioural level). Finally, the theoretical layer of the model highlights that the nature, strength and relative influence of the beliefs, attitudes and perceptions identified is determined by an individuals underlying values or core beliefs, which represent a core category with underpins these processes.

7.6 Chapter Summary

This chapter presented a detailed account of the analytical procedures, decisions and processes implemented throughout this GTM study, from early concept identification of the first interviews through to the presentation of a two-layer substantive explanatory model. After describing how the early coding of the first interviews led to the identification of a number of potentially relevant concepts, micro-

analytical and more advanced analytical procedures, eventually led to more detailed descriptive observations of the data. As more interview data was obtained, further exploration of the early emergent insights occurred using a range of comparative procedures. This led to the development of the descriptive layer of the final model, which conveys both PA behaviour change and maintenance as a process involving a series of cognitions which ultimately determine our PA behavioural responses. It is explained that people will demonstrate different orientations within this process and a number of sources which ultimately drive people's cognitions are identified. The descriptive layer also reveals that the end product of this process (PA participation related actions) can vary greatly in nature. To account for outcome variations and different individual orientations, a second (theoretical) layer was developed through ongoing theoretical sampling and analytical procedures. This theoretical layer describes a system of underlying *values*, which are hypothesised to interact with life situations to ultimately dictate the extent to which a person internalizes their PA participation related actions, through the cognitive process described in the descriptive layer.

The analytical procedures and processes described in this chapter provide a transparent account of an evolving theory generative GTM process. However, in order to justify the explanatory or theoretical nature of the final model, it is important to demonstrate that all theoretical possibilities were appropriately explored (See Chapter 6, Section 6.6 for details on theoretical saturation). Consequently, before presenting and discussing the final explanatory model, the following Chapter (8) details a number of member checking/model refinement procedures.

Chapter 8: A Value Centred Explanatory Model of Successful Long-Term Physical Activity Behaviour Change

8.1 Introduction

The previous chapter provided a transparent account of the evolving analytical processes, which led to the development of a preliminary explanatory model of successful PA behaviour change. As explained in Chapter 5, a key characteristic of any grounded theory is that there should be evidence that theoretical saturation was achieved. Charmaz (2006) explains that saturation refers to the point "when gathering fresh data no longer sparks new theoretical insights, nor reveals new theoretical properties of the categories identified" (p.113). Consequently, the first aim of this chapter is to present evidence of how theoretical saturation was achieved using member checking related procedures. Second, based on this process, a number of model refinements⁶ are made and a summary of the complete findings are presented. Third, the theoretical implications are discussed, alongside presenting a more detailed review of additional emergent literature sources. This includes references to much of the theoretical literature discussed in Chapter 2. To distinguish between the early rationale chapters of this thesis (Chapters 2 & 3) and the use of literature to develop and discuss the final grounded theory, the term secondary literature review has been adopted. This describes a process of reviewing additional relevant literature, based on the emergent findings of this GTM study. Due to the iterative nature of GTM, this secondary review of literature was not confined exclusively to the end of the GTM process, as the structure of this chapter would suggest. Instead it emerged throughout the analytical process, as observations were made and concepts and categories explored. However, to preserve the continuity of the theoretical development process, more detailed descriptions of this emergent literature are presented at the end of the analytical process (alongside the theoretical implications).

8.2 Theoretical Saturation and Model Refinement

8.2.1 Theoretical Saturation

As the emergent understanding became increasingly more theoretical or explanatory, fewer new emergent lines of enquiry were generated. This was evident

⁶ Once again, to acknowledge the role of the principal researcher in the theory construction process, the first-person pronoun is used at times to refer directly to the 1st author of this thesis where appropriate.

because the emergent question memos (See Chapter 6, Section 6.1) contained increasingly less content. Consequently, this presented me with early evidence that theoretical saturation was occurring because fewer emergent lines of enquiry were being generated. However, in recognition of the fact that theoretical saturation is a key characteristic of any grounded theory, additional model refinement interviews and procedures were conducted to confirm that gathering further data was not yielding additional theoretical insights. Morse (1995) suggests that researchers often declare that saturation has occurred without providing supporting evidence. To provide such evidence I adopted member checking based procedures as a means of checking and refining the emergent understanding. Although member checking traditionally refers to taking ideas back to participants for their confirmation, Charmaz (2006) explains that they can also serve to refine categories and identify any significant gaps in the ideas presented. Consequently, my final set of interviews were more structured, to allow for details of the emergent theoretical account to be explained to the interviewees, who were then asked whether and to what extent this accounted for their own experiences. Further details of this process are described below.

8.2.2 Model Refinement

To ensure that pre-existing theoretical insights were not forced upon the final interviewees, each of the member checking/model refinement interviews began in the same manner as previous interviews, whereby participants were invited to tell their own story of PA behaviour change. These responses could then be compared to the preliminary findings presented in Chapter 7. However, unlike earlier interviews, preliminary findings were also explained to the interviewees and it was discussed how their own experiences were either consistent with or contradictory to these previous insights. To avoid creating bias, this occurred towards the end of the interview process. In most cases, the different accounts of behaviour change presented were highly consistent with previous emergent findings. However, some further insights were gained, providing additional clarification as to the specific nature or role of a number of previous emergent concepts. These additional insights generally centred on either ascertaining the appropriateness of the terminology adopted to describe the analytical observations made, or clarifying the role of the underlying value structure construct.

8.2.2.1 Terminology Changes

During the final member checking/model refinement interviews, I found myself able to reflect on the previous analytical observations I had made, particularly with regards to the language I had used to describe these observations. Specifically, as greater analytical insights were gained into particular concepts, the terminology had not always evolved accordingly. Therefore, in order to accurately convey all emergent conceptual and theoretical insights, a number of changes were made. For example, early in the GTM process, *verbal persuasion* was identified as a type of *situational/informational cue* in order to account for the different types of verbal information people receive (e.g. advice, encouragement, instruction, the provision of information etc.). However, the term "persuasion" arguably suggests of an externally controlled, autocratic process and therefore does not account for all the different types of verbal stimuli that emerged. Consequently, I decided to refer to these as *verbal stimuli* as opposed to persuasion.

Additionally, as a result of the analytical procedures described in the previous chapter, a number of different types of cognition were identified (i.e. *perceptions*, *beliefs*, *attitudes*). Whilst conducting the final member checking/model refinement interviews I realised that these terms were often used interchangeably, presenting the reader with potentially confusing conceptual and theoretical insights. Consequently, it was important that the final explanatory model differentiated between these and remained consistent in its references to them. Traditionally, "perception" refers to a process of attaining awareness or understanding of sensory information (Mather, 2004). Therefore, the term *perceptions* was adopted, to account for people's more immediate responses to the *situational/informational* cues they are presented with. *Beliefs* on the other hand refer to the non-evaluative (i.e. personally favourable or unfavourable) assumptions people develop about themselves, the world they live in, and the situations they encounter (Gross, 2001). Therefore, they account for the PA related outcome and process expectations identified from the data. Lastly, *attitudes* have been described as hypothetical constructs which reflect an individual's own evaluation of events and objects (Zimbardo & Leippe, 1991). Consequently, they account for the individual opinions and intentions highlighted in the emergent data and are reflective of the interaction between a person's underlying *values* and the situations they are presented with.

The final terminology related observation made, relates to the proposed interactions between people's underlying values, the *situational/informational* cues they

are presented with and the various resultant cognitions identified. Specifically, as the underlying *values* construct was explored in more detail, the term *interaction* seemed insufficient to fully capture the role of this underlying structure. Consequently, the term "filtering" has been adopted based on Levenson's (1999) biocultural model of emotion. Levenson's model uses this terminology to demonstrate how underlying cultural influences dictate the assessment of situation specific information and the nature of associated emotional responses. However, unlike Levenson's model, the current findings identify a value hierarchy as the underlying structure which dictates the nature of the different emotional, cognitive and behavioural responses described. Therefore, the final explanatory mode (Figure 8.1) depicts a series of value filters to account for these interactions.

8.2.2.2 Emotional Arousal

As explained in Chapter 7, *emotional arousal* emerged early in the analysis as a concept which appeared to be linked to peoples PA behaviour change experiences. It was identified as a response to *informational/situational cues* and was commonly observed and coded for in subsequent interviews. However, when it was addressed in the member checking/model refinement interviews, further insight into the significance of this concept was gained. Specifically, the interview data challenged the fact that *emotional arousal* always occurred in response to *situational/informational cues*. This stimulated a re-inspection of the *emotional arousal* references, which revealed that when *emotional arousal* is experienced, this may suggest a perceived link between the *situational/informational cues* presented and someone's core *values*. This was evident because the source of a person's *emotional arousal* was usually related to data representative of their own, more salient, underlying *values*. Therefore, *emotional arousal* appears to represent an affective response only triggered when a situation either conflicts or facilitates congruence with a person's underlying *values* (for more information on the actual *values* identified, with examples, See Chapter 7, Section 4.1).

8.2.2.3 Differentiating Between Attitudes and Outcome Beliefs

The analytical procedures and observations documented in Chapter 7, revealed that peoples' perceptual responses to *situational/informational cues* go on to inform the development of PA participation related *outcome*, *self-efficacy* and *control* beliefs. However, during member checking/model refinement interviews it became apparent that these different categories may not accurately account for all the beliefs and

attitudinal responses described in the data. Specifically, alongside developing *beliefs* regarding potential *outcomes* of PA, it seems that people develop *process related beliefs* (i.e. relating to how they might go about becoming more physically active) and demonstrate evaluative attitudes, which appear to relate to their own involvement in PA. For example, participants often expressed *desires* to be more physically active or recognised that they needed to be fitter. Like emotional arousal these desires, needs, intentions etc. were only evident when a situation either conflicted or was highly congruent with a person's underlying *values*. Therefore, the final explanatory model (Figure 8.1) differentiates between the different beliefs and attitudinal responses people describe.

8.2.2.4 Clarifying the Roles of Self-Efficacy and Control

The preliminary theoretical account developed and described in Chapter 7 identified both *self-efficacy* and *control beliefs* as potentially important determinants of PA behaviour change. The previous emergent data revealed that these determinants might explain the observed variations in the relationship between *intentions* and behavioural actions. This was confirmed for *self-efficacy* in the member checking/model refinement interviews, because the additional interview data revealed that it became an important determinant of change or ongoing participation when situations caused conflict between multiple values (*value conflict*) or threatened the performance of *value congruent* behaviour (*situational conflict*). Specifically, *self-efficacy* represents an assessment of a person's capability to overcome such conflict. In addition, the member checking/model refinement interviews also revealed that *control beliefs* were more closely associated with the behavioural and cognitive outcomes described. Specifically, when people described stable, *value congruent* participation they also demonstrated a high degree of personal *control* over their actions, compared to instances of unstable participation when *value* or *situational conflict* was being experienced.

8.2.2.5 Value Re-structuring and Automatic Processing

Finally, while conducting the member checking/model refinement interviews, I realised that, the emergent theoretical understanding did not fully account for two important observations which had been evident throughout. First, while value congruence had been presented as an explanation of stable participation, the process of moving from less stable participation or sedentary behaviour (low *value congruence*) to achieving this, had not been accurately described. In addition, a number of interviewees

who had achieved this, appeared to demonstrate more *habitual* participation, whereby a process of developing conscious intent was evident. Re-examination of the data revealed that as people familiarise themselves over time with situations which bring about *value congruence*, they develop an association between those situations and a *value congruent* response. Consequently, when faced with opportunities to achieve those responses, they no longer need to go through the process of developing conscious intent to act on that situation. These repeated experiences of *value congruence* also appeared to result in *value restructuring*, whereby the relative importance of different *values* changed when people experienced the positive affective responses associated with achieving *value congruence*. To account for these processes and for the way *values* dictate the nature of our immediate perceptual and emotional responses, the final explanatory model (Figure 8.1) differentiates between instances of conscious and subconscious processing.

8.3 Final Model Summary

In summary, the results of this GTM based study have led to the development of a Value Centred Theory (VCT) of PA participation (See Figure 8.1).

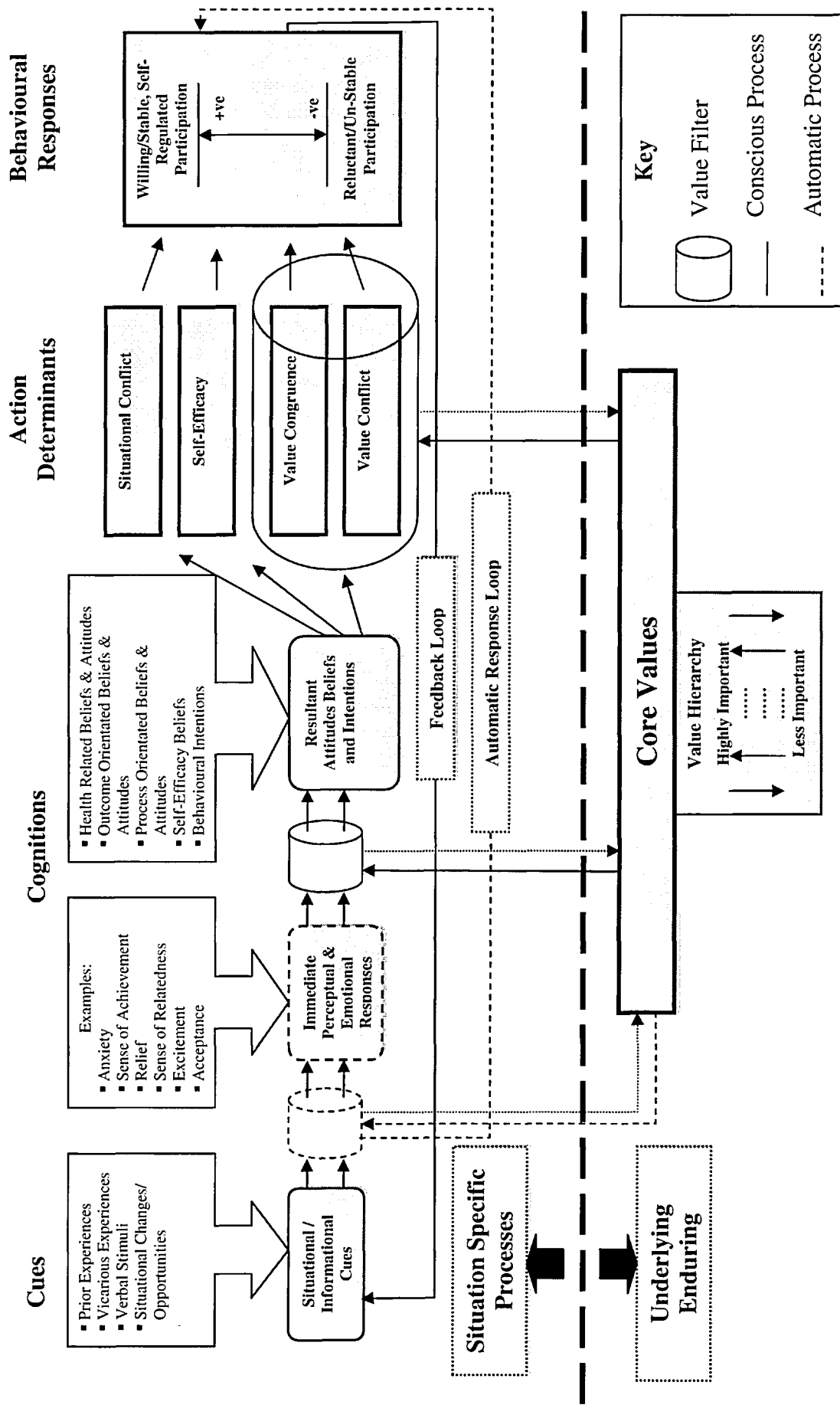


Figure 8.1 Value Centred Theory of Physical Activity Participation

The VCT developed in this thesis demonstrates that interactions between different life situations and peoples underlying values ultimately dictate a person's ability to change their PA habits and maintain those changes. More specifically, successful PA behaviour change appears to be representative of a diverse range of behavioural and cognitive states, which have been conceptualised as differing levels of participation stability. To explain these different outcomes, VCT suggests that throughout life people draw on, receive, or are exposed to various sources of information (i.e. past & present experiences, visual observations, verbal stimuli). It is these different situational/informational cues which provide both the starting point for people to make changes to their PA habits and the stimulus for continued participation. For example, a medical professional may present someone with information about the risks associated with their current sedentary behaviour, or a person might experience poor or improved health for themselves. This information results in a number of immediate perceptual and emotional responses. Within a PA behaviour change context, these are likely to relate to or be directed towards PA participation. The more detailed emergent findings described in Chapter 7 highlighted perceptions relating to effort, competence, social relatedness and health. Alongside these a number of associated emotional responses were also identified (e.g. anxiety, relief, excitement). An interpretation of these situational/informational cues and the associated perceptual and emotional responses are then hypothesised to lead the development of peoples PA participation related attitudes and beliefs, their self-efficacy beliefs and their behavioural intentions.

To add further explanatory insight into the processes described above, the VCT proposes an additional underlying core value layer. The value layer represents an organisational scheme of peoples underlying, more enduring beliefs. These are hypothesised to be reflective of people's orientations in life, based on what they attribute importance to. The more detailed emergent findings described in Chapter 7 highlight that the most prominent values congruent with successful PA behaviour change appear to fall into the following categories: first, socially orientated (e.g. the importance of close interpersonal relations), second, competence orientated (e.g. the importance of personal success/competence), third, control orientated (e.g. the importance of independence of action) and fourth, health orientated (e.g. the importance of being physically capable of embarking on life tasks). The model demonstrates that these underlying core values interact with the situational/informational cues people are presented with, on both a conscious and subconscious level, to influence the

development of people's beliefs, attitudes and intentions. To demonstrate this, two value filtering phases are highlighted, where information, perceptions and emotions are responded to according to a person's value hierarchy or the relative ordering of their core values. In addition, the VCT also proposes that people's actual PA participation is determined by the degree of congruence between the beliefs, attitudes and intentions people develop, relating to PA participation, and their underlying values. Where value congruence is lacking, then value conflict is likely to exist, whereby values which are not congruent with people's PA related beliefs, attitudes and intentions are of greater importance than those that are. In such situations, self-efficacy becomes an important determinant of change or ongoing participation because it represents an assessment of a person's capability to overcome that conflict. Finally, to account for the different practical barriers people encounter (e.g. lack of transport to leisure facilities, incapacitating injuries, etc.) perceived situational conflict was identified as an important action determinant.

Although the value hierarchy structure depicted is hypothesised to be relatively stable and enduring, VCT highlights that over time value restructuring can occur as a result of repeated exposure to situations which bring about value congruence and associated positive affective responses. Ultimately, this increased familiarity with value congruent situations reduces the need for conscious intent and results in habitual participation in such situations.

For the purposes of the theoretical model depicted in Figure 8.1, the following definitions are proposed:

- *Value Congruence* - when PA related attitudes and/or outcome beliefs are congruent with people's more salient underlying values.
- *Value Conflict* - when a situation presents itself which causes conflict between people's multiple underlying values.
- *Situational Conflict* - when situational factors (e.g. practical barriers) conflict with people's intended actions.

To bring about willing, stable participation, the model demonstrates that individuals need to strive for high value congruence and minimise value or situational conflict. However, these hypothesised patterns of behaviour will only occur if the PA related attitudes and or outcome beliefs are positive in nature. If people demonstrate negative attitudes or beliefs regarding their own PA participation, then value congruence will result in people's actions reflecting these beliefs. Consequently, it is desirable for people to develop positive attitudes and/or beliefs about PA participation

and demonstrate congruence between these and their underlying core values. For further discussion on how to achieve such outcomes, see Chapter 9 (Section 3).

8.3.2 Example Physical Activity Behaviour Change Scenarios

To demonstrate how the above model accounts for successful change, the following three scenarios are presented. These demonstrate how the various elements of the model interact to explain the dynamics of long-term PA behaviour change.

Scenario 1: Highly Stable Participation

Stable enduring participation occurs when positive PA participation related attitudes/outcome beliefs are congruent with a person's more salient underlying values (i.e. some aspect of PA participation is deemed to be of high personal importance). In these cases, participation related self-efficacy (i.e. the confidence a person possesses in their ability to participate) is generally high because participation is perceived effortless due to the absence of any value conflict (i.e. when high priority values which are not congruent with PA participation become more salient). However, when someone is acting on their own high priority values (no value conflict), they are likely to invest more effort in situations where a threat to that value is perceived (i.e. situational conflict). Consequently, actions congruent with highly salient values are more likely to be internally controlled. Participation in this scenario is stable and enduring because the underlying value construct which drives it, is hypothesised to be relatively stable across situations and time. Despite this, participation is never entirely stable because lapses in participation can happen if value priorities change or if situational changes occur, which lead to value conflict or situational conflict.

Scenario 2: Unstable Participation

Unstable maintenance appears to occur when people experience some (rather than complete or dominant) value or situational conflict (i.e. when situations present themselves, which cause conflict between value priorities or, which present barriers to threaten the performance of behaviour congruent with high priority values). For example, people may possess underlying values which are congruent with positive PA participation related beliefs, but also experience situations where other, non PA participation congruent values are considered to be of equal or greater priority. In such situations PA participation might be disrupted if people prioritise responding to their non PA participation congruent values. Alternatively people may display PA participation related beliefs, which are highly congruent with their more salient

underlying values but experience situations where practical barriers conflict with desired behavioural outcomes. In such situations, removal of practical barriers may result in willing participation. However, an individual's ability to overcome such barriers will decrease if value conflict is present. Specifically, value conflict can result in the reduced significance of positive PA participation related beliefs compared to alternative behavioural beliefs. People overcome such situations and demonstrate instances of willing participation by experiencing changes in their outcome, self-efficacy and/or control related beliefs, resulting in greater congruence between their underlying values and positive PA participation related beliefs.

Scenario 3: Highly Unstable, Reluctant Participation

In contrast to the two maintenance related scenarios presented above, highly unstable reluctant participation (i.e. failure to maintain changes) is likely to occur when there is a lack of congruence between positive PA related attitudes/outcome beliefs and people's underlying values. In such situations people may lack positive PA participation related beliefs (i.e. demonstrate no positive attitudes towards PA participation), prioritise values which are unlikely to be congruent with PA participation (e.g. work competence) or be faced with insurmountable practical barriers (e.g. a debilitating injury).

8.4 Secondary Literature Review and Theoretical Implications

As highlighted in Chapter 2 of this thesis, a number of social cognition models and the TTM have received considerable attention within exercise psychology in attempts to provide theoretical insight into peoples PA participation related behaviours (See Biddle & Mutrie, 2008). Coupled with this, a considerable body of research evidence highlights a number of PA barriers and social and environmental correlates (e.g. Blanchard et al., 2005; Giles-Corti, Timperio, Bull & Pikora, 2005). However, due to the disparate nature of these theoretical and empirically grounded underpinnings, there is still no comprehensive theoretical account of the PA behaviour change process. Arguably what is lacking from these theoretical insights, are the underlying mechanisms (i.e. personal & situational factors) which relate these different sources of information to one another, to ultimately add greater explanatory depth to the insights they profess. Chapter 2 also highlighted a lack of theoretical insight into the processes and mechanisms responsible for sustainable long-term PA behaviour change, and the subsequent need to gain further insight into this phenomenon. Developing a better

understanding of long term PA behaviour change, should ultimately encourage the development of theoretically grounded intervention approaches, which bring about successful maintainable change.

8.4.1 Introducing an Additional Theoretical Interpretation

In addition to the explanations proposed by existing theoretical approaches (See Chapter 2), the grounded theory developed and described in this thesis, presents further insight into PA participation and long-term change. First, a number of individual cognitions are acknowledged as observable processes which relate to different sources/stimuli and responses to real world situations. Second, these processes are hypothesised to be underpinned by interactions between life situations and peoples underlying values and the relative importance ascribed to them. Ultimately it is proposed that an individuals core beliefs or values and their relationship with situational information/cues, dictate their ability to make changes to their PA habits, maintain those changes, and the nature of any ongoing PA participation. This chapter argues that the introduction of the value concept represents a unique theoretical dimension, which provides significant additional insight into the PA behaviour change process. Consequently, the first part of this section reviews a wider body of literature, which relates specifically to the emergent categories and processes presented in the final model. In addition to this discussion of secondary literature, the theoretical implications are also discussed, which includes references to the previously highlighted (Chapter 2) popular theoretical approaches.

8.4.2 Value Theories

From as far back as the early 1950's considerable research literature and discussion is evident within the behavioural and social sciences, which centres on the idea that people possess a set of underlying or core values (e.g. Braithwaite & Law, 1985; Rokeach, 1968, 1973; Schwartz, 1992). However, the enthusiasm for this value construct originally declined in line with a rise in the principles of behaviourism and remained out of favour due to a dominance of more objective scientific methods (Hiltin & Piliavin, 2004; Rohan, 2000). Support for the latter is presented in Chapter 2 of this thesis, where the popularity of adopting pre-existing theoretical models in exercise psychology is demonstrated. However, as highlighted in Chapter 2, the measurable observable processes and constructs that are identified in these do not always lead to an appropriate level of explanatory or theoretical depth. As a potential solution to this, this

thesis proposes a theoretical model which emphasises the role of the value construct as a crucial underlying determinant of peoples PA related behaviours.

The model developed in the thesis describes values as underlying, more enduring beliefs or the principles they possess that demonstrate what they attribute importance to in their lives. Previous value related literature, conceptualises values as a set of organised, analogical principles or beliefs relevant across situations and time, which can be used to imbue meaning to newly encountered objects and events (Rohan, 2000). Human values have also been described as the most important independent variable in the study of social attitudes and behaviour (Rokeach, 1973). Therefore, as well as emphasising the enduring or underlying nature of values, previous understandings of the value construct also stress its key role in the interpretation of different situations and life events. Consequently the underpinning nature of core values, emphasised by the theoretical model developed in this thesis, has been recognised and explored by previous theorists.

In summarising much of the earlier value related literature, Schwartz and Bilsky (1990) identified five features of the value construct. They highlighted that values concern: 1) beliefs, 2) desirable end states or behaviours, 3) trans-situational guides, 4) the selection and evaluation of behaviour and events, 5) the relative ordering of these beliefs. The above features all contribute to what is commonly referred to as a value system, which has been described as a “stable, meaning producing superordinate cognitive structure” (Rohan, 2000, p.257). Therefore, the higher order (or superordinate) core value layer of the final results model, presented earlier in this chapter (Figure 8.1), might be more appropriately described as a value system. To explore this suggestion, comparisons can be made between the characteristics of the theoretical model presented in this chapter and the value system characteristics described within the wider value theory related literature.

While the present study has identified values as an important underlying PA behavioural determinant, examination of the value related literature appears to suggest that there may be considerable further insight to be gained into the exact nature of these underlying core beliefs. For example, one of the most prolific value theorists, Rokeach, posits that values are beliefs relating to specific modes of conduct or end-states of existence (Rokeach, 1973). Therefore from his perspective values are concerned with both ways of being (e.g. beliefs regarding the importance of ultimately feeling competent or socially secure) and ways of behaving (e.g. beliefs regarding the importance of being honest or supportive to others). Consequently, recognising this

distinction may be an important part of achieving value congruence and understanding the potential for value conflict. For example, if a person expresses the belief that a high level of personal health is of utmost importance to them, then it would be logical to presume that presenting them with the opportunity to exercise at a gym will result in value congruence. However, if they also value honesty and openness as behavioural characteristics then a highly competitive gym environment may conflict with their values. Therefore, while the results of the current study emphasise that in a PA behaviour change context, the degree of value congruence/conflict appears to be more centred on end states of existence than modes of conduct (e.g. the importance of improved physical health versus work life competence or career advancement), this might reflect a failure to recognise the different ways values can be represented.

In order to communicate the enduring nature of human values, Schwartz and Bilsky (1990) and Rohan (2000) adopt the term trans-situational guides, when referring value systems. This is intended to convey the fact that the values people possess remain relatively stable across situations and time. The enduring nature of underlying values is explained by Rokeach (1973) as arising from the fact that they are initially taught and learned in isolation from other values in an all-or-nothing sense. For example, when we are introduced to concepts such as honesty or deceit, they are usually presented as either desirable or un-desirable states. However, if values are accepted as being both completely stable in nature and a fundamental determinant of human behaviour, it could feasibly be argued that individual change is not possible because we are bound to the underlying values we possess. To account for behavioural and attitudinal changes Rokeach (1973), explains that as people develop or mature in life, it becomes increasingly likely that they will encounter situations which cause competition between the multiple values they possess. In such instances they are forced to consider the relative importance of those values and ultimately, the behavioural response or attitude they demonstrate is representative of the values they choose to prioritise. To account for this, Rokeach's value system (1973) includes an organisational scheme where values are arranged based on their relative importance. Therefore according to this perspective, successful PA behaviour change occurs when situations conflict with values associated with sedentary behaviour causing them to prioritise values which are more closely linked to positive PA related habits.

Clearly the findings of this GTM based study offer support for Rokeach's value theory (1968; 1973), because the theoretical model developed from the data depicts a similar value structure/hierarchy and also suggests that situational variations can lead to

changes in the value structure and ultimately in peoples attitudinal and behavioural responses. However, while Rokeach's value theory does account for change in this way, it does not necessarily explain the phenomenon of successful long term PA behaviour change. For example, after making initial changes to their PA habits, many of the participants interviewed throughout the course of this study demonstrated increasingly stable habitual PA, which appeared to no longer depend on a conscious interpretation of specific situational or informational cues. The current theoretical model accounts for this by suggesting that a high degree of value congruence and low level of value conflict are important characteristics of long-term maintainers. In order to achieve this, it suggests that change can occur on two different levels. In the short term, it can be a response to the situational changes and subsequent weighing of values against one-another, described by Rokeach (1973). However, in these situations value conflict remains high and consequently positive PA habits are dependent on the right situational cues. Therefore, the model depicts a second level of change whereby re-structuring of the underlying value hierarchy occurs as a result of repeated exposure to situations which bring about value congruence and positive affective responses.

In attempts to gain greater insight into human value systems, theorists have begun to explore and identify the specific types of value which are contained within these systems and the potential relationships between them. This avenue of research appears to have originally been spawned by Rokeach (1973) who identified a series of terminal (relating to end states of existence) and instrumental (relating to modes of conduct) values. However, these values were reportedly identified based on his own intuition and as a result have been criticised on the basis that no theory or value structure was proposed to support their existence (Schwartz, 1996). Schwartz argued that in order to understand the consequences of a higher priority being ascribed to one type of value over another, it is necessary to demonstrate some theoretical underpinnings. Consequently, the theoretical depth of Rokeach's value system appears limited because he failed to address how the different values identified may relate to one-another and the consequences of different organisations of relative importance.

To address the criticisms described above, Schwartz and colleagues developed a value theory which attempted to account for the motivational consequences of the values identified (e.g. Schwartz & Bilsky, 1987, 1990; Schwartz, 1992). Schwartz's (1992) theory of human values identifies 10 motivationally distinct types of values, hypothesised to be evident within and across cultures (See Figure 8.2). The theory maintains the assumption that people differ in the relative importance they place on

each value. To describe this, Schwartz uses the term “value priorities.” He also agrees that these value priorities are sensitive to environmental changes. In addition, his theory suggests that actions expressive of any of the values he identified have practical, psychological and social consequences (Schwartz & Boehnke, 2004). Thus, Schwartz’s theory may provide additional insight into the findings presented in this chapter by highlighting a number of common values, and explaining what the potential behavioural and/or attitudinal consequences of prioritising them are.

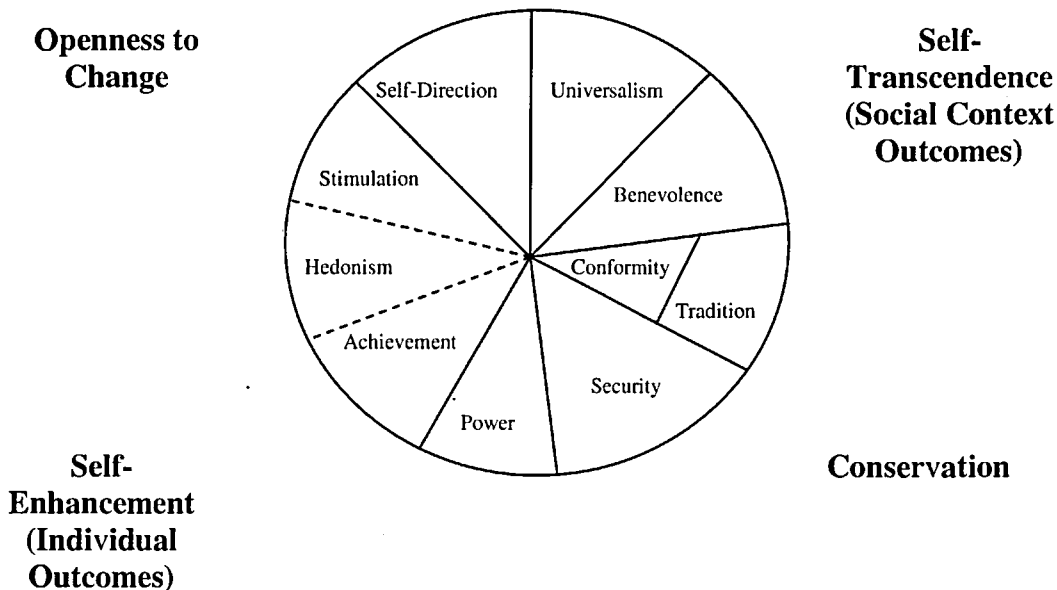


Figure 8.2 Schwartz’s Proposed Value Structure (adapted from Schwartz & Boehnke, 2004; & Rohan, 2000)

Schwartz’s theory of human values highlighted two motivational dimensions, which form the structure of his proposed value system. They are hypothesised to represent two fundamental human problems that need to be solved. One dimension, labelled openness to change vs. conservation refers to a conflict between “being motivated to follow one’s own intellectual and emotional interests in unpredictable and uncertain directions” or “to preserve the status quo and the certainty it provides in relationships with close others, institutions and traditions” (Schwartz, 1992, p.43). The second dimension labelled self-enhancement vs. self-transcendence (individual vs. social context outcomes), relates to the conflict between concern for the consequences of own and others actions for the self and concern for the consequences of own and others actions in the social context. The 10 value types identified by Schwartz (1992) are arranged along these two dimensions. To represent this and demonstrate the proposed relationships between the different values, a "circumplex" structure has been

proposed (Figure 8.2). The figure attempts to demonstrate that people's priorities on adjacent value types will be similar, whereas maximum differences in priorities will occur when values are opposite each other. This is explained by that fact that, the closer any-two values are to one-another on the circumference, the more similar their underlying motivations are hypothesised to be; and the more distant, the more antagonistic they are (Schwartz & Boehnke, 2004). Finally, the structure is described as being quasi circumplex because values are not equally spaced throughout the circle and "tradition" is placed outside "conformity" because despite sharing the same broad motivational goal, conformity values are said to entail subordination to persons with whom one is in frequent interaction, whereas tradition values are said to entail subordination to more abstract objects (Schwartz, 1992).

If support can be found for the existence of the value types proposed by Schwartz (1992), within exercise psychology populations, then his theory could offer additional depth to the findings presented in this chapter. Specifically, it may be possible to identify which value types are generally more congruent with positive PA related attitudes and associated outcomes. For example, it could be argued that people who prioritise values representative of the openness to change dimension are going to be less resistant to making PA related lifestyle changes, when presented with different situations/opportunities, compared to those who prioritise the opposing conservation related values. Alternatively it may also be possible to identify the type of situational/informational cues which encourage the development of value congruent attitudes and beliefs. For example, the extent to which individuals prioritise social context outcomes over individual context outcomes is likely to impact on their willingness to change when faced with different activity options and the perceived associated potential outcomes of these.

8.4.3 Values and Exercise Psychology

Within the applied exercise psychology literature, a call has been made to consider peoples values or core beliefs as a foundation for future intervention development (Anshel, 2005). Based on a similar rationale to the one presented in this thesis, it was argued that although a multitude of cognitive and behavioural intervention strategies are being developed and implemented, the mechanisms that lead to behavioural changes are still not fully understood (Anshel, 2005). Consequently, even when intervention strategies appear to work, it is not necessarily clear why this is. As a solution to this potential gap in the knowledge base, Anshel introduced values as an

important factor that needs to be acknowledged. He highlights the fact that individuals' values and beliefs are largely neglected by researchers seeking to influence PA behaviour. A potential reason for this, concerns the fact that previous theoretical accounts have also neglected the value construct. Anshel (2005) suggests that unless people endorse values such as health, family and performance excellence, that are consistent with a healthy and active lifestyle, their willingness to begin and maintain an exercise programme is unlikely.

In order to encourage interventionists to consider peoples underlying values, Anshel (2005) proposed the Disconnected Value Model (DVM). The model assumes that self motivated behaviour is reflective of a person's deepest values and beliefs, because people are more likely to become fully engaged in activities that meet their personal values. Therefore, Anshel's (2005) model does support the idea that value congruence represents an important source of positive behavioural responses. However, the DVM also suggests that if a person possesses values, which appear to relate positively with PA related behavioural pursuits, but their actual behaviours are not consistent with that value, then this represents a disconnected link between value and behaviour. The consequences of this are continued negative habits. Based on previous value literature and the findings presented in this chapter, the term "disconnected" appears inappropriate and potentially contradicts the DVM's own theoretical groundings. For example, when justifying the need to consider values and beliefs, Anshel appears to emphasise that our values are inextricably linked to our behavioural actions, a belief which is consistent with much of the more prominent value literature described earlier in this chapter (e.g. Rokeach, 1973; Schwartz, 1996). Therefore, by suggesting that it is possible for actions to become disconnected from people's underlying values, the DVM could be seen to be overlooking the presence of values which are not consistent with positive health or PA related pursuits. By conceptualising these instances as value or situational conflict, as per the model described in this chapter (Figure 8.1), all actions (desirable and undesirable in nature) remain connected to people's underlying values. The DVM also appears to oversimplify the interactions which seem to occur between underlying values and cognitive and behavioural responses in different situations. Consequently, understanding the degree of value congruence or conflict people experience in different situations may be more useful than assuming a 'disconnect' between negative habits and underlying values.

8.4.4 Values, Self-Determination and Internalization

As explained earlier in this discussion, a decline in value related literature in recent years has been observed (Hiltin & Piliavin, 2004). However, Rohan (2000) has suggested that this decline may simply reflect a shift in the terminologies being used to represent it. For example, as explained in Chapter 2, as part of the SDT Deci and Ryan (1985) introduce a process of internalization to explain behaviour that becomes increasingly self-regulated. They define internalization as “a process whereby an individual requires an attitude, belief or behavioural regulation and progressively transforms it into a personal value, goal or organisation” (Deci & Ryan, 1985, p.130). Therefore, although SDT has been described as a control centred theoretical approach (Biddle & Mutrie, 2008) the internalization process it describes, appears to involve developing of a high level of congruence between a person’s own values and the cognitive beliefs and behavioural actions they demonstrate.

According to SDT, this process is hypothesised to represent a natural human tendency, which requires ongoing support from the social environment in order to function effectively (Ryan & Deci, 2000). Therefore, like the VCT and the value theories described earlier in this chapter, SDT recognises the role of environmental or situational cues as important behavioural determinants. However, as explained in Chapter 2 (Section 3.2), to account for this process, SDT describes three basic psychological needs (Competence, Relatedness & Autonomy), which if satisfied, will facilitate the internalization process. In addition, to account for individual differences in people’s orientations towards achieving internalization, SDT proposes three different motivational or causality orientations (Autonomy, Control & Impersonal orientations). Therefore, although SDT does make reference to the value concept, its theoretical underpinnings are heavily centred on the satisfaction of basic human needs.

Hiltin and Piliavin (2004) distinguish between needs and values by explaining that needs signify biological influences, whereas values serve as socially acceptable, culturally defined ways of articulating needs. Consequently, both value centred theoretical approaches and approaches which focus on basic needs, such as SDT, may compliment one-another. Specifically, values appeared to be closely linked to causality orientations described in SDT, because they both represent underlying orientations or tendencies. As a result, value systems may provide a more detailed representation of peoples motivational or causality orientations (value priorities) and the implications of these different orientations when faced with specific situational/environmental cues. Understanding the motivational consequences of different value priorities may generate

further insight into what constitutes a competence, relatedness or autonomy supportive environment. Conversely, the Basic Needs Theory (BNF) element of SDT provides an underlying mechanism for the relative structuring of individual value systems.

8.4.5 Values and Implementation Intentions

The theoretical model developed in this thesis also provides insight into how attitudes, outcome beliefs and intentions are transformed into actions. This intention-behaviour relationship has received considerable research attention in response to a number of observed gaps in the related literature. Specifically, although a number of prominent theoretical models such as the Theory of Planned Behaviour (TPB; Ajzen, 1991) and the Protection Motivation Theory (Rogers, 1983) construe a person's intentions to act as being the most immediate predictors of behaviour, research evidence has found behavioural intentions to be a relatively weak predictor of actual behaviours (Sheeran, 2002). This is particularly true of health related behaviours where review based evidence reveals that positive intentions to engage in health behaviours are successfully translated into actions less than half of the time (Sheeran, 2002). This weak intention-behaviour relationship suggests that many people fail to act on their own good intentions.

To explain how people overcome this apparent intention-behaviour divide, Gollwitzer (1999), introduced 'implementation intentions'. Gollwitzer differentiates between these and the 'goal' intentions referred to above. He explains that while goal intentions are the result of translating non-committal desires into binding goals, implementation intentions specify the when, where and how of responses, leading to actual goal attainment (Gollwitzer, 1999). They achieve this by linking anticipated opportunities/situations with goal directed responses (Sheeran, Milne, Webb & Gollwitzer, 2005). Therefore, they represent situation specific plans of action or mental representations/associations. These mental associations are hypothesised to enhance information processing related to specific cues and eventually lead to the automatization of the intended goal directed behaviour, when such specific anticipated situations are encountered (Sheeran, Webb & Gollwitzer, 2005). Therefore, implementation intentions lead to a shift from conscious effortful control, to the performance of behaviours controlled automatically by selected situational cues. Gollwitzer (1999) also suggests that the strength of implementation intention effects will vary based on the level of commitment to the formed implementation intention and to the underlying goal intention.

The current results do account for the effects of implementation intentions and therefore may provide support for Gollwitzer's findings. Specifically, the VCT developed in this thesis depicts an automatic processing loop which negates the need for conscious intent. This is hypothesised to occur as a result of repeated exposure to situations which encourage "value restructuring" and allow people to achieve a high level of congruence between their actions and their underlying values. Therefore, implementation intentions may represent a self regulatory process directed towards achieving value congruence. The extent to which a person has achieved value congruence may also account for the varying levels of commitment, described by Gollwitzer, towards implementation intentions and their underlying goal intentions. Specifically, the level of commitment a person demonstrates towards a behavioural intention is likely to be representative of the perceived importance they place on the associated outcome. Therefore, the strength of implementation intentions and consequently the behaviour-intention relationship might be explained by a person's underlying value priorities and the perceived potential to achieve a high level of congruence between these and situation specific goal directed responses.

8.4.5 Self-Efficacy

As explained earlier in this chapter, the concept self-efficacy emerged from the data as an important determinant of PA behaviour change and sustained participation. Specifically, the VCT revealed that through the interpretation of situational and informational cues, alongside the development of PA related attitudes and beliefs, people also develop beliefs about their own capabilities to engage in their intended PA related actions. Self-efficacy is defined as "the belief in ones capabilities to organise and execute the courses of action required to manage prospective situations" (Bandura, 1995: p.2). Consequently, it was introduced into the present theoretical model because the beliefs people described appeared to represent PA participation related self-efficacy.

As explained in Chapter 2, there is considerable research evidence, which suggests that self efficacy plays an influential role in the adoption of health behaviours, including PA, and the maintenance of change (Connor & Norman, 2005; McAuley et al., 2003). The results of the present study support this evidence because the data suggested that the level of self-efficacy a person demonstrates is closely related to their actual PA related actions. Specifically, when value congruence is high and there is no value or situational conflict, the model hypothesises that participation related self-efficacy will also be high, because an individual will possess strong behavioural intentions and

minimal perceived barriers. However, in the event of value or situational conflict, self-efficacy becomes an important determinant of change or ongoing participation because it represents an assessment of a person's capability to overcome that conflict.

In describing self-efficacy, Bandura (1997) also highlights four separate sources of self-efficacy (performance accomplishments, vicarious experiences, verbal or social persuasion & emotional arousal), which are hypothesised to influence the development of efficacy beliefs. Figure 8.1 demonstrates that all of these are accounted for by the situational/informational cues and the perceptual emotional responses identified during this study, (prior experiences, vicarious experiences, verbal stimuli, emotional responses). However, the current model adds further theoretical depth to the development of self-efficacy beliefs by demonstrating that our underlying value priorities may determine the relative influence of these sources for different individuals. For example, someone who attributes high importance to independence or personal control related values, may be less receptive to verbal persuasion compared to someone who attributes high importance to social interactions.

8.4.6 The Transtheoretical Model

Up to this point, this discussion section has focussed predominantly on responding to the major categories and processes described in the emergent model (Figure 8.1). As a consequence, a considerable amount of secondary theoretical literature (literature not previously identified in Chapter 2) has been discussed. However, much of the rationale for conducting this GTM based study was centred on a critique of the existing body of theoretical literature in exercise psychology. For example, Chapters 2 and 3 of this thesis placed considerable emphasis on critically reviewing and exploring the TTM and its applications to PA behaviour change. This occurred in response to its observed popularity within exercise psychology, particularly as a theoretical underpinning for numerous intervention strategies. Consequently, Chapter 3 reported on a systematic review of TTM based PA interventions (Hutchison, Breckon & Johnston, in press) in order to ascertain the efficacy of these approaches. Unfortunately, due to limitations associated with the studies reviewed, the evidence surrounding the efficacy of TTM based approaches remains inconclusive. However, throughout the process of conducting this review and in light of the critical overview of TTM presented in Chapter 2 (Section 3.4), a number of criticisms associated with the TTM as a theoretical framework for PA behaviour change, were identified. In general, it was

concluded in Chapters 2 and 3 that the TTM does not provide an accurate enough theoretical framework for understanding the process of PA behaviour change.

Despite the criticisms directed at TTM, the results of this GTM study do account for many of the behaviour change related constructs it emphasises. However, the model presented in this chapter also demonstrates considerable additional theoretical insight into these, thus potentially confirming TTM's limited theoretical depth. For example, the experiential processes of change highlighted by the model are described as representing cognitions which people are hypothesised to engage in, in order to stimulate change (Prochaska & Norcross, 1994). The theoretical model presented in this chapter accounts for these by demonstrating that such cognitions were observed from the interview data as responses to situational/informational cues. In addition, the exact nature of these responses appeared to be a function of peoples underlying value priorities. Therefore, if people demonstrate emotional arousal (dramatic relief) alongside perceiving physical inactivity to be a significant risk factor for them (consciousness raising), then the model proposes that they are likely to attribute importance to personal health related values, and that situational information they have been presented with either threatens or provides opportunity for congruence with these values.

In addition to the experiential processes of change, TTM also highlights five behavioural processes, which represent change related behavioural actions which people engage in. The present model accounts for these by highlighting the fact that varying degrees of value congruence and conflict result in different behavioural outcomes, associated with different levels of stability. For example, self-liberation (making strong commitments to change or maintain) is likely to be more prominent when value congruence is high, whereas stimulus control related processes (e.g. providing ongoing reminders to keep participating) are suggestive of value or situational conflict, making participation less stable. An increase in value or situational conflict, is also likely to account for the decisional balance dimension of TTM, which describes the relative weighting of the pros and cons of change (Velicer et al., 1998). For example, if someone perceives that PA behaviour change has negative consequences, then it may reflect that they attribute importance to values which conflict with PA related beliefs and actions (e.g. valuing family relations over personal health).

8.4.7 Other Popular Theoretical Approaches in Exercise Psychology

Although the TTM was explored in considerable detail during the early chapters of this thesis, Chapter 2 also critically examined the wider existing body of theoretical literature. Consequently, to fully explore the implications of this research, it is important to reconsider this literature in light of the present findings. As explained in Chapter 2 of this thesis, current popular theoretical accounts of PA behaviour change generally focus on well-known motivational, health and social psychology theories and models. However, because none of these were developed to specifically account for PA related behaviours, a number of limitations associated with adopting these in a PA context have been highlighted. As a result, Chapters 2 and 3 of this thesis argued for the need to develop a more comprehensive theoretical understanding of the PA behaviour change process. In response to these arguments, the grounded theory presented in this chapter was developed. By making comparisons between this and previous popular theoretical approaches, the usefulness of the VCT can be demonstrated.

As explained in Chapter 2, the Theories of Reasoned Action (TRA: Ajzen & Fishbein, 1980; Fishbein and Ajzen, 1975) and Planned Behaviour (TPB: Ajzen, 1991) have received considerable attention within exercise psychology in attempts to understand PA participation related behaviours. However, criticisms have been directed at them on the grounds that they only account for deliberate processing (Connor & Norman, 2005), they fail to account for external (non-cognitive) determinants (Biddle & Mutrie, 2008), and their theoretical or explanatory depth is limited. Figure 8.1 demonstrates that the theoretical model developed in this thesis both compliments and adds greater explanatory depth to TRA and TPB by addressing concerns. First, the model provides support for TRA and TPB by recognising the role of process and outcome related behavioural beliefs as important intention and ultimately behaviour determinants. However, it then goes on to account for the development of these attitudinal and belief related components by demonstrating an interaction between people's underlying value structure or system and situational/informational cues. In providing this additional theoretical depth, the model also accounts for the influence of external or environmental determinants. Second, the model also accounts for a shift from conscious effortful control, to the performance of behaviours controlled automatically by explaining that if an association is formed between situational cues and the performance of value congruent actions, then this can negate the need for conscious intent.

As explained previously in this chapter, value priorities may be closely related to causality orientations, as described in SDT, because both represent underlying tendencies. Based on this same argument, achievement related orientations can probably also be linked to value priorities. As explained in Chapter 2, a distinction has been made between people who are ego (i.e. motivated to demonstrate superiority over others) and task orientated (i.e. motivated by feelings of mastery) and it has been suggested that these different competence related orientations may be linked to peoples PA related attitudes and behavioural actions (Duda, 2001). The model developed from this thesis accounts for this by demonstrating that perceived competence or a sense of achievement is a product of an interaction between situational/informational cues and a persons underlying values. Therefore, for someone to experience a sense of achievement they must be presented with information or experience a situation that is congruent with what they consider to represent an achievement. Consequently, achievement orientations might be more appropriately described as underlying value priorities.

8.4.8 Maintenance - The Phenomenon of Interest

Finally, as explained in Chapter 3 (Section 5), the aim of this thesis was to develop a comprehensive theoretical account of successful PA behaviour change. Using GTM, it set out to understand how and why people make changes to their PA related behaviours and go on to maintain those changes. Consequently the concept of maintenance within a PA behaviour change context was central to this thesis. Arguably, the term maintenance has been popularised by the TTM, which defines it as the stage of change where people work to prevent relapse and consolidate the behavioural changes they have made (Prochaska et al., 1992). However, as explained in Chapter 6 (section 2.2), maintenance can be difficult to define when applied to different behaviour change contexts. Despite this, to recruit an appropriate initial sample (of maintainers), the concept was defined simply as: a behavioural process of continued participation in PA at a level consistent with that which was desired or prescribed prior to any changes occurring. By adopting this definition, it was then possible to recruit an initial sample that should provide insight into how and why maintenance can occur in this context (See Chapter 6 for detailed recruitment & sampling procedures).

Based on the results of this GTM study, it could be argued that the term maintenance is not an appropriate way for theoretical models to describe or conceptualise successful PA behaviour change. For example, in alternative health behaviour change contexts where the emphasis is simply on stopping a negative health

related behavioural habit (e.g. smoking cessation, drug & alcohol abuse), there is usually a clearly definable desired outcome (i.e. to stop smoking, using drugs or abusing alcohol). Consequently, maintenance can generally be defined as the ongoing achievement of this outcome or the achievement of this outcome for a given amount of time. In addition, relapse in these contexts simply describes the resumption of negative behavioural habits (i.e. smoking, drinking, & drug taking). As demonstrated by the findings of this study, successful PA behaviour change encompasses a wide range of behavioural outcomes or goals and maintenance can only really be identified if specific individual reference is made to these. Therefore, it is crucial to recognise the individualistic nature of maintenance, when applied to PA behaviour change contexts, in order to accurately evaluate change related outcomes. To illustrate this, a recent review of PA counselling based interventions differentiated between physiological, cognitive and behavioural outcomes as different markers of change (Breckon et al., 2008).

In order to recognise the case specific nature of maintenance in PA behaviour change, the theoretical model developed and reported in this and the previous chapter, focuses on a number of common outcome related characteristics, which all the successful changers demonstrated to a lesser or greater extent. These resulted in PA related outcomes being conceptualised as varying degrees of PA participation related stability as opposed to successful maintenance or relapse. Therefore, all of the theoretical observations demonstrated in the final model (Figure 8.1) explain variations in participation stability. Arguably relating specific theoretical observations to outcome variations, has far greater applied implications than adopting a stage orientated view, where links are made between desired outcomes or processes and stages, which can be difficult to define.

8.5 Chapter Conclusions

This chapter has presented and discussed the theoretical implications of the final refined explanatory model, developed in this thesis. The discussion demonstrates that the theoretical account developed, presents a unique perspective of successful PA behaviour change, which addresses many of the concerns associated with existing theoretical models by introducing an underlying value centred dimension. While calls have been made to consider people's values as important behavioural determinants within applied exercise psychology (Anshel, 2005), until now, no empirical support for this has been offered. Therefore, the results of this study present a call for value

congruence and conflict to be recognised as important determinants of PA related attitudes, intentions and ultimately actions. However, to explore the role of values further within PA behaviour change, future research might first need to gain a better understanding of the different types of values people possess. As a consequence, a potentially valuable future line of enquiry might be to consider the relevance of Schwartz's (1992) value system within PA behaviour change related populations. In order to explore how the theoretical insights presented in this chapter can be used to inform applied practice within exercise psychology, the next chapter (9) explores the applied implications of these findings in detail.

Chapter 9: Thesis Discussion - Implications for Research and Practice

9.1 Introduction

Throughout the course of this thesis, three closely related studies have been conducted to address both theoretical and methodological enquires within exercise psychology. Chapter 3 reported on a systematic review conducted to explore applications of the most prominent theoretical framework in exercise psychology, the TTM. Chapter 5 critically explored GTM as a form of enquiry within exercise psychology, raising a number of quality control issues. Chapters 6, 7 and 8 describe a GTM based study designed to advance current theoretical explanations of long-term PA behaviour change. In each case, findings have been presented and the theoretical implications of these have been discussed. The purpose of this chapter is to advance previous discussions by highlighting the implications of these findings from a research and applied practice perspective. First, the theory development process and final explanatory model is evaluated based on the findings of Study 2 (Chapter 5). This generates discussion on the implications of adopting GTM and CAQDAS for theory development. Second, applications of theory to practice are discussed with specific reference to how the explanatory model presented in the previous chapter should be used to inform applied practices. Within this, a number of significant reforms to current intervention practices are proposed. Discussion is also included on overcoming the limitations highlighted in Chapters 2 and 3 regarding previous attempts to utilise theory in applied exercise psychology.

9.2 Implications for Theory Development

The central theme of this thesis is concerned with the advancement of current theoretical explanations of long-term PA behaviour change. Consequently, the three studies which comprise this thesis all contribute, in some way, to achieving theoretical advancement within exercise psychology. As explained in Chapter 4, GTM was selected as the most appropriate methodology for responding to the observed theoretical gaps in the exercise psychology literature. However, because GTM has been interpreted from a range of epistemological and theoretical standpoints, a number of quality control issues have been raised regarding how to conduct GTM based research. Consequently, Study 2 of this thesis (Chapter 5) critically reviewed GTM applications within exercise psychology, based on criteria developed from all the major GTM revisions (Hutchison, Johnston & Breckon, in press). The results of this review raised a number of important

implications for future GTM studies (See Chapter 5, Section 5.2), which centre on encouraging research to remain consistent with the basic tenets of GTM and the epistemological position and/or theoretical stance assumed. In order to evaluate the grounded theory developed and presented in this thesis and generate further discussion on theory development using GTM, the first section of this chapter will consider the present findings in light of the implications presented in Study 2.

As explained in Chapter 5, GTM based research should represent a process of concentrated active involvement by the researcher (Charmaz, 2006), that centres around the data collected and its relationship to the studied phenomenon. Therefore, it is not simply a case of following a standard set of procedural rules; instead, the researcher must engage with the methodology and interact with their data and emergent understandings. Charmaz (2006) explains that this process represents a strength of GTM because it allows for flexibility with regards to the epistemological positions it can account for and the different techniques it can accommodate. However as highlighted in Chapter 5, to evidence this, researchers need to present a transparent account of all the procedures and decisions that take place.

9.2.1 Transparency

It is generally accepted that when communicating the findings of qualitative work, transparency is essential (Bringer et al., 2004; 2007). As highlighted in Chapter 4, it is important to recognise that researchers will inevitably conceptualise differently and put variable emphasis on the data depending on factors such as their professional background and their underlying ideologies (Corbin & Holt, 2004). Consequently, it is important for researchers to provide a clear description of the analytical processes and the procedures that they employ, so that other researchers and critics are able to follow the logic that led to the concepts and categories proposed.

To achieve this, the GTM presented in this thesis adopted the CAQDAS QSR-NVivo as an organisational and data management tool. As explained in Chapter 6 (Section 6.6), through use of the memo function, a complete record of the evolving research process was maintained. This included a diary of general research events, details of all the analytical decisions made and procedures employed, summaries of emergent observations and questions as well as reflections on all of the aforementioned procedures. By documenting this in NVivo, the process of engaging with the methodology, described by Charmaz (2006), could be captured. Therefore, this information provides considerable insight into both the evolving sampling and

analytical processes and the underlying theoretical perspective and research question driving this. To communicate this information, it was then possible to integrate these memos into Chapter's 7 and 8 of this thesis to provide a transparent account of how the study progressed in line with a GTM based approach. Consequently, this thesis supports previous claims that NVivo can be used to encourage greater transparency (Bringer et al., 2004; Johnston, 2006).

9.2.2 Theoretical Sampling

Chapter 5 concluded that, within any transparent account of a GTM based study, there should be evidence to suggest that sampling or data gathering is dictated by the research problem and that the resultant concepts and categories developed are representative of the data itself. As highlighted in Chapter's 2 and 3, one of the major criticisms directed at previous theoretical accounts of PA behaviour change, concerns their limited ecological validity. Specifically, none of the theories and models regularly cited were initially intended to explain PA behaviour change or habitual PA participation (Marcus & Forsyth, 2003). Consequently, the explanations they propose are not grounded in real-life PA behaviour change experiences. To overcome this, GTM encourages the development of substantive theory grounded in relevant empirical data (Glaser & Strauss, 1967). However, to achieve this it is crucial that the data collected in any GTM study remains central to the theory constructing process. Consequently, both theoretical sampling and the associated iterative process are crucial characteristics of GTM, which encourage the emergent understanding to remain close to the actual data collected (Hutchison et al., in press A).

To obtain this level of closeness with the data, in the present study, initial sampling was purposive in nature in order to capture information relevant to the research question. Subsequent sampling and analytical decisions were then dictated by the emergent questions generated from the data collected. To facilitate this, data gathering occurred in a number of phases throughout the course of the study and coding was conducted on all interview transcripts to identify concepts and categories from the raw data. When deemed necessary, changes in sampling, data collection strategies and specific questioning occurred, to obtain further insight into emergent observations. As the analysis developed, if the data presented new emergent possibilities, these were incorporated into the analysis and/or emergent theory and responded to accordingly. All of these procedures are consistent with the principles of theoretical sampling, outlined in Chapter 5 as a key GTM characteristic.

Once again, many of the NVivo functions facilitated these theoretical sampling related procedures in the present study. As explained in Chapter 6 (Section 6.3), all the data documents were imported into NVivo for coding. This involved creating references to sections of text (nodes) to represent pertinent analytical observations. Linked to these were text documents (conceptual memos), which provided a workspace for discussion and further insight into the associated analytical observation. These conceptual memos were added to as further insights were gained. Where an emergent question was identified, a further link was made to an emergent questions memo, which represented a summary document designed to stimulate exploration of emergent questions in subsequent sampling procedures (See Chapter 6, Table 6.2 for a summary of the NVivo memo structure created). This series of links created between NVivo project items created an analytical trail which led back to a section of raw data, thus ensuring that the data remained central to the emergent understandings being constructed. The frequent references to related raw data quotes in Chapter 7, provides evidence of this. By adhering to these procedures throughout, the GTM study conducted in this thesis is effectively making a legitimate claim to ecological validity for the final explanatory model presented.

9.2.3 Conceptual and Theoretical Development

Another observed limitation with current theoretical accounts, highlighted in Chapters 2 and 3, concerns the theoretical depth of the insights they profess. For example, the TTM describes 10 processes of change which refer to the techniques individuals use to modify their thoughts, feelings and behaviour (Prochaska & Norcross, 1994). While the model offers some explanatory insight into these by explaining when they are likely to occur, it does not explain why they are important or demonstrate any of the mechanisms responsible for their occurrence. Alternatively, the TRA and TPB identify various types of beliefs which act as important behavioural determinants (Connor & Norman, 2005). Again, while these theoretical accounts offer some explanatory insight, by demonstrating that these beliefs inform the development of specific attitudes and perceptions which then go on to shape peoples behavioural intentions, they do not reveal the mechanisms responsible for the formation of such beliefs.

In order to encourage the development of a more comprehensive theoretical account of PA behaviour change, GTM was selected as the chosen methodology for this study. This decision can, in part, be attributed to the fact that GTM is intended to assist

with the development of explanatory theoretical models (Charmaz, 2006). As a consequence, another key characteristic of GTM, highlighted in Study 2 (Chapter 5), is that there should be evidence of theoretical density. Therefore attempts must be made to move the analytical process beyond descriptive observation, into the realm of an explanatory theoretical framework (Glaser & Strauss, 1967; Glaser, 1978; Strauss, 1987). This was achieved in the present study by implementing more advanced analytical and comparative procedures to ask appropriate questions of the data and further develop emergent concepts and categories. Evidence to support this is presented in Chapter 7, which demonstrates how the analysis evolved from early descriptive observations to more abstract theorising through the identification of dimensions and relationships associated with the emergent themes and categories.

9.2.3 The Final Explanatory Model

If appropriate measures have been taken to encourage conceptual and theoretical depth, the end of a GTM study should reveal a substantive, explanatory theoretical model of the studied phenomenon (Corbin & Strauss, 2008) and not just a descriptive account of the data collected. As explained and discussed in the previous chapter, there should also be evidence of theoretical saturation to indicate that all theoretical possibilities were appropriately explored. While attempts to demonstrate theoretical saturation for the current study are described in Chapter 8 (Section, 2.1), no explicit discussion on the quality or appropriateness of the final model has been presented. To evaluate the final theoretical account in more detail, Charmaz's (2006) quality control criteria, provides a useful framework. As explained in Chapter 5, Charmaz's criteria for evaluating GTM focuses on the credibility, originality, resonance and usefulness of the final model.

9.2.3.1 Credibility

Credibility refers to the extent to which the research endeavour has achieved intimate familiarity with the data, which itself should be sufficient to merit the claims that have been made (Charmaz, 2006). Therefore, by demonstrating such credibility a research endeavour is effectively demonstrating the ecological validity of its findings. As explained earlier in the chapter, to ensure such closeness to the data, researchers should consider utilising CAQDAS to create an analytical trail. This will help to ensure that every step of the GTM process, from early descriptive observations to latter more abstract theorising, can be traced back to relevant segments of data.

9.2.3.2 Originality

Originality refers to extent to which the concepts and categories identified yield new theoretical insights (Charmaz, 2006). Therefore, it is concerned with the significance of the findings in light of existing ideas and practices. The theoretical implications discussed in Chapter 8, demonstrate that the VCT developed in this thesis compliments many of the pre-existing theoretical accounts, while at the same time offering an alternative explanatory perspective on the PA participation and change process. As a consequence, a considerable body of (original) literature, which has yet to be explored in exercise psychology, was discussed. As explained in Chapter 6, literature was incorporated into the present analysis in response to emergent concepts, to illuminate potential lines of enquiry. This process stimulated considerable emergent questioning and subsequent theoretical insights, supporting Charmaz's (2006) claims that previous literature can assist with theoretical development and help facilitate the constant comparative method. However, to avoid forcing pre-existing ideas into the theoretical development inappropriately, it is important that researchers provide sound justification for the inclusion of literature and do not let it undermine what the data is telling them. As a result a critical stance to such literature is encouraged (Henwood & Pidgeon, 2003). This can be facilitated by using memos to provide a platform for discussing the relevance of literature. In addition, if CAQDAS is used, these memos can be incorporated into the analytical trail (via memo links) allowing the analyst to assess whether literature based analytical decisions can still be traced back to the emergent data.

9.2.3.3 Resonance

Resonance is intended to account for the extent to which the emergent concepts and categories represent the fullness of the studied experience (Charmaz, 2006). Therefore, for the present study, it is concerned with the extent to which the findings are representative of peoples PA behaviour change experiences or make sense to the population of interest. By incorporating a member checking/model refinement phase into the GTM process conducted in this thesis, the analysis allowed for the emergent understanding to be scrutinised by relevant stakeholders (i.e. members of the population of interest). As a result of this process, a number of model refinements were made to ensure a greater level of resonance between people's experiences and the final model. Guba and Lincoln (1989) have suggested that member checks are a critical technique for establishing credibility and subsequent relevance to the population of interest.

Consequently, as well as helping to present evidence of theoretical saturation, member checking procedures are also likely to encourage a higher degree of resonance, as defined above.

9.2.3.4 Usefulness

Lastly, usefulness refers to the extent to which applied implications offer advances to both future research and everyday practice (Charmaz, 2006). In highlighting a considerable body of original value based theoretical literature, the previous chapter has uncovered a number of potential future lines of enquiry. For example, in response to the findings of this thesis a number of prominent value theories were discussed. Among these was Schwartz's (1992) theory of human values, which identifies 10 motivationally distinct types of values, hypothesised to be evident within and across cultures. It further proposes the motivational consequences of different value priorities within this structure. Therefore, the relevance of Schwartz's (1992) value system within PA behaviour change related populations may be a valuable line of enquiry to pursue, in order to increase the predictive power of the present model. In addition, Chapter 8 also argues that the value concept identified, may offer a powerful explanatory dimension to previously adopted theoretical accounts such as the TPB and the TTM, making them increasingly more useful as theoretical underpinnings. Consequently, evidence presented so far in this analysis appears to support the usefulness of the VCT. To add further support to this contention, the remainder of this chapter discusses how the present findings could go on to inform applied practices and PA intervention designs.

9.2.4 Summary of Implications for Theory Development

So far this chapter has demonstrated how various measures were taken throughout the course of this thesis, to ensure that the research conducted represents an accurate example of GTM. Central to this was the use of the CAQDAS package QSR-NVivo, which if used appropriately, has been demonstrated to facilitate many aspects of the GTM process from the design and early sampling procedures, through to the analysis of data, theoretical development and presentation of findings. It also helps encourage the presentation of a transparent account of these processes. Therefore, this thesis supports and strengthens previous arguments that QSR-NVivo does compliment many aspects of a GTM approach (Bringer et al., 2006a; di Gregorio, 2003). However, the techniques described throughout were heavily influenced by the specific sampling

and analytical decisions made, which in turn were dictated by the present research question and a constructivist epistemological position. As a consequence, some of the procedures described may not be congruent with the needs of every GTM based research endeavour and the epistemological viewpoints or theoretical perspectives of the researchers involved. There are also a number of additional NVivo functions, which were not utilised by this study, which may offer further organisational or analytical benefits. However, as expressed previously in this thesis, the use of computers is not intended to replace the ways people learn from data, but to increase the effectiveness of such learning (Bazeley, 2007).

Based on the evidence presented in this thesis, future GTM research must consider the defining GTM characteristics identified within this thesis, alongside the specific study needs and epistemological standpoint assumed. Only then should CAQDAS be considered as a way of satisfying specific research requirements in a manner consistent with the tenets of GTM. Attention to this process should enable the development of substantive explanatory/theoretical accounts, grounded in relevant (to the phenomenon of interest) empirical data (Bryant & Charmaz, 2007). This should ultimately present more powerful implications for practice, within the particular domain of interest. In order to demonstrate this, the following section of this chapter addresses the practical implications of the theory generated within this thesis.

9.3 Implications for Practice

Although convincing theoretical evidence has been presented in this thesis to support the potential usefulness of the VCT, its implications for applied practice have not yet been discussed. To inform this particular line of discussion, Study 1 of this thesis raised a number of important implications for applications of theory to practice, which should be acknowledged. Specifically, the first study (Chapter 3) reported on a systematic review of TTM based PA behaviour change interventions, designed to determine the efficacy of approaches based on this popular model of change. However, as reported in Chapter 3, few of the reviewed studies reported to have applied all facets of the model and subsequently failed to acknowledge its multidimensional nature. As a result, the efficacy of TTM based approaches could not be determined because only seven of the reviewed interventions were accurately based on the model. Arguably, in order to benefit from the explanatory qualities of any theoretical account, it is crucial to recognise the significance of the multiple dimensions which comprise it (Hutchison, Breckon & Johnston, in press). Specifically, theories achieve their explanatory depth by

the relationships they propose between their specified dimensions, concepts and categories. These relationships help comprise integrated frameworks that can then be used to predict or explain phenomena (Corbin & Strauss, 2008). Consequently, applications of theory to practice must demonstrate a complete understanding of the theoretical account in question.

For the purposes of the VCT developed in this thesis, it is important to recognise how all the different dimensions of the model (See Chapter 8, Figure 8.1) interact to inform applied practice. For example, the model suggests that in order to bring about willing, stable participation, there must be high value congruence and no value or situational conflict. Therefore, interventions need to consider ways of achieving congruence between an individual's underlying values and their PA related attitudes and/or outcome beliefs. However, the results also suggested that these hypothesised patterns of behaviour will only occur if the PA related attitudes and or outcome beliefs are positive in nature. As a consequence, it is crucial that this theoretical observation is accounted for in intervention designs. Alternatively, VCT also proposes that we develop our beliefs regarding PA participation based on interpretations of various situational/informational cues. However, the interpretation of these is further hypothesised to be a factor of their underlying value priorities. Therefore, the underlying values dimension of the model must be taken into account by interventions seeking to alter behavioural beliefs through the provision of different situational/informational cues. Consequently, to fully benefit from the findings of this thesis, proposed intervention strategies must accurately account for the model developed, by recognising the VCT's multidimensional nature.

9.3.1 Acknowledging Underlying Values in Intervention Designs

As explained in Chapter 8, the VCT developed in this thesis suggests that in order to bring about willing stable participation, interventions must strive to encourage high value congruence and minimal value or situational conflict. If value or situational conflict occurs, this will likely have a detrimental effect on peoples PA habits (i.e. an increased chance of behavioural lapses resulting less stable participation). In such situations, self-efficacy has been shown to be an important factor in resolving such conflict. Therefore, alongside striving for value congruence, interventions should also consider ways of encouraging increased PA participation related self-efficacy. However, these hypothesised patterns of behaviour will only occur if the PA related attitudes and or outcome beliefs are positive in nature. If people demonstrate negative attitudes or

beliefs regarding their own PA participation, then value congruence will result in people's actions reflecting these beliefs. Consequently, it is desirable for people to develop positive attitudes and/or beliefs about PA participation and demonstrate congruence between these and their underlying core values.

9.3.1.1 Current Intervention Strategies

As explained in Chapter 2, it is relatively common for current PA intervention strategies to attempt to influence people's more immediate beliefs/attitudes towards PA participation using a range of informational and behavioural approaches (Kahn et al., 2002; see Chapter 2, section 2 for an overview of different types of PA intervention). In addition, attention has also been paid to the reduction of potential barriers and creation of environments that are more conducive to change (Hillsdon et al., 2005). Therefore, current intervention practices do appear to recognise behavioural beliefs and attitudes as important determinants of change and the potential for situational conflict. However, according to the VCT developed, in order for changes in behavioural beliefs to bring about sustained behavioural changes, there must also be some degree of congruency between those beliefs and a person's more enduring underlying values.

As explained in the previous chapter, there is considerable research support for the underlying value construct proposed by the VCT (e.g. Rohan, 2000; Rokeach, 1973; Schwartz, 1992; Schwartz & Boehnke, 2004). Consistent with the VCT, this existing value literature conceptualises values as being part of a 'personal' cognitive structure (Rohan, 2000). The personal nature of these value systems is accounted for by the value priorities people demonstrate. As a consequence, in order for intervention strategies to facilitate value congruence, they must be sensitive to individual differences in value priorities. Arguably very few current intervention strategies possess these individualistic qualities. For example, PARS often attempt to address individual needs on a practical level (i.e. tailoring an exercise programme to suit someone's physical health condition), but fail to account for variations in people's underlying orientations (i.e. their value priorities). Consequently, when an individual demonstrates value congruence as a result of their participation in a PARS, it is likely to have occurred more by chance than through intentional individual intervention tailoring. Alternatively, it could be argued that the popular stage matched interventions (informed by TTM) do represent individually tailored approaches, because they encourage an individual assessment of a person's stage of change and then match specific strategies to these (Hutchison et al., in

press). However, once again, at no point are peoples underlying values taken into account, instead people are categorised into one of five broad stages.

One current technique, which does potentially address individuals underlying values, is brief interventions/advice (See Chapter 2, Section 2.2). As explained in Chapter 2, brief interventions were originally adapted from the client centred counselling style of MI (Miller & Rollnick, 2002). Although the use of brief interventions and MI is often justified based on the TTM, as a method of encouraging movement through the earlier stages of change, MI has been explicitly linked to people's core values. Specifically, Wagner and Sanchez (2002) agree that values are a significant element in the behaviour change process and demonstrate that MI can be used as a tool for focussing on a client's values, to encourage change that is linked to, or congruent with these. Based on Rokeach's (1973) definition of human values, Wagner and Sanchez (2002) explain that in achieving such change, resultant behaviours will be specifically directed towards people's idealised modes of behaviour and states of existence. Consistent with the terminology used in the current thesis, they adopt the phrase "value congruence" to describe such situations.

Motivational Interviewing has been described as "a client-centred, directive therapeutic style to enhance readiness for change by helping clients explore and resolve ambivalence" (Hettema, Steele & Miller, 2005, p. 91). Wagner and Sanchez (2002) explain that "from a humanistic viewpoint, MI involves assisting individuals in defining their current and ideal selves, then pursuing movement from the current self towards the ideal" (p. 291). Therefore, it encourages a process of reflecting on personal values to identify where conflict needs to be resolved in order to achieve congruence. Conflict is conceptualised in MI as ambivalence to change. In their description of MI Miller and Rollnick (1991, 2002) outline its four key principles (express empathy, roll with resistance, develop discrepancy & support self-efficacy), which Wagner and Sanchez (2002) suggest, can all contribute to a process of resolving such value related conflict or ambivalence.

To assist patients in recognising value conflict that needs to be resolved, a tool that is often incorporated into MI based interventions is Rokeach's (1973) card sort task (e.g. Graeber, Moyers, Griffith, Guajardo & Tonigan, 2003). Graeber et al. (2003) explain that this exercise involves patients or clients being given a set of cards, each of which contains a value word hypothesised to account for the human values identified by Rokeach (1973). The patient is then asked to sort each of these cards into one of three piles, to indicate whether they are not important, important or very important to them.

Once this has been done, the therapist or health professional uses the very important cards to generate open ended questions which focus on the values the client highlighted to try and identify value conflict that needs resolving. For example, in a PA behaviour change setting the health professional might ask: why they chose those value words, what they mean to them personally, how they know they have those values, and how they relate to their PA habits. This should encourage patients to see where they have values which are inconsistent with sedentary behaviours. However, if the client provides answers that indicate their card choice is consistent with an undesirable behaviour (physical inactivity) then Graeber et al. (2003) highlight the importance of adopting the MI 'roll with resistance' principle (Miller & Rollnick, 2001). For example, the health professional may ask the client to reflect on one of the alternative very important values, which does appear to conflict with their sedentary behaviour, and explore that in more detail. Therefore, adopting MI skills and the card sort task can not only facilitate identifying a discrepancy between underlying beliefs and sedentary behaviours, but can also direct health professionals towards potential solutions or ways of achieving value congruence.

Although MI based interventions appear to be able to account for peoples underlying values, the research evidence supporting the efficacy of these approaches within PA behaviour change remains limited. As with many of the current approaches discussed in Chapter 2, there is evidence to suggest that they may lead to modest short term increases in PA participation but little to support their long-term efficacy (Hillsdon, et al., 2002; Marshall et al., 2005; Pinto et al., 2005). As explained in Chapter 2 (Section 2.2), brief interventions involve opportunistic advice, discussion, negotiation or encouragement delivered by health professionals within routine consultations (Dunn & Rollnick, 2003). Consequently, they are limited by time constraints and are unlikely to be able to accommodate a process of eliciting and responding to value related information. While more intensive MI based interventions can achieve this, again the evidence supporting their efficacy is mixed, with little support for their ability to achieve sustainable, long-term change (Britt, Hudson & Blampied, 2004; Hettema et al., 2005; Knight, McGowan, Dickens & Bundy, 2006). There are also no PA behaviour change related examples of value targeted MI approaches (i.e. ones that have utilised Rokeach's card sort task). Consequently, further research is warranted to establish the efficacy of MI within PA behaviour change and its ability to elicit and respond to value based information accordingly.

Ultimately, the results of this thesis represent a call for increasingly individualistic intervention designs, which are sensitive enough to account for and respond to individual value priorities, to encourage and support more enduring PA behaviour change. As explained in Chapter 2, limited research support is available for the efficacy of current intervention designs. A possible explanation for this, is that many of them appear to neglect the underlying cognitions highlighted in the results of this GTM study. While a case could be argued for the increased adoption of MI based approaches, the evidence supporting this is far from conclusive and recent calls have been made to advance MI applications with caution (Allsop, 2007). Specifically, Allsop highlights an observed lack of theoretical support for MI and its ability to account for all of the mechanisms responsible for human behaviour change (Heather, 2005). Therefore, it may be useful to look beyond currently adopted PA intervention approaches and consider a wider body of applied psychology literature. The following section of this chapter explores alternative ways of achieving increasingly individualistic approaches, and discusses the practical implications of these.

9.3.2 Case Formulation and the Cognitive Therapy Model

The clinical psychology literature reveals that applied practices have evolved over the years in response to criticisms directed towards applying a diagnostic or medical model approach to the treatment of psychological disorders (Bruch, 1998). These criticisms appear to have emerged in line with the rise in popularity of cognitive therapy. Specifically, it was suggested that medical or psychiatric diagnosis can neglect the complex array of factors which need to be considered, or simply reduce them to a relatively broad classification (Tarrier, 2006). For example, if two patients present similar symptoms but the development and/or maintenance of those symptoms is explained by very different factors, then it is unlikely that the same course of treatment will be appropriate in both cases. Within PA behaviour change, because NHS primary care settings represent a common starting point for current interventions strategies (e.g. PARS), this type of diagnostic approach is likely to be prominent. Consequently, the popularity of techniques such as stage matching, within PA behaviour change, may simply reflect the dominance of this medical model approach in healthcare settings, because it allows for people to be classified according to the characteristics they present.

To address these concerns within clinical psychology settings, the concept of case formulation was proposed as an alternative to diagnostic, symptom-technique matching. Case formulation is prominent in a number of cognitive and behavioural

therapies and refers to performing an individualised assessment of clinical cases or patients that is sensitive to variations in the development, manifestation and maintaining mechanisms of people's psychological problems (Bruch & Bond, 1998). Therefore, it accounts for the potential difficulties associated with treating people under a medical model approach who demonstrate identical symptoms but for very different reasons. Consequently, adopting a case formulation approach in exercise psychology may allow for a more individualistic approach to encouraging and supporting PA related behavioural changes.

Case formulation involves the collection and assimilation of a relevant body of information to help formulate the factors that have influenced the origins, development and maintenance of an individual's mental health problems (Kuyken, Padesky & Dudley, 2009). Therefore, if adopted by PA behaviour change interventions it would serve to uncover the various underlying determinants or mechanisms that contribute to a person's negative PA habits or sedentary behaviour. According to the VCT developed in this thesis, this should elicit information demonstrating a lack of value congruence towards positive PA participation related beliefs/outcomes or the presence of value or situational conflict. In addition, the formulation process should be sensitive enough to uncover how the lack of congruence and sources of conflict have come about. Within cognitive therapy, case formulations are closely linked to the cognitive model, from which, cognitive therapy is derived. The cognitive model (See Figure 9.1) hypothesizes that people's emotions and behaviours are influenced by their perceptions of events, which in turn are a function of the beliefs and attitudes they hold, and the organization of these (Beck, 1995). Like the VCT, the cognitive model identifies different levels of beliefs, which interact with situational cues to bring about emotional and behavioural reactions. Therefore, in cognitive therapy, case formulation serves to build up information which relates to the different dimensions of the cognitive model, in order to build a complete picture of, or 'conceptualize', the clients presenting difficulties (Beck, 1995). Consequently, a similar approach within exercise psychology could be designed to elicit information which accounts for the different dimensions of the VCT.

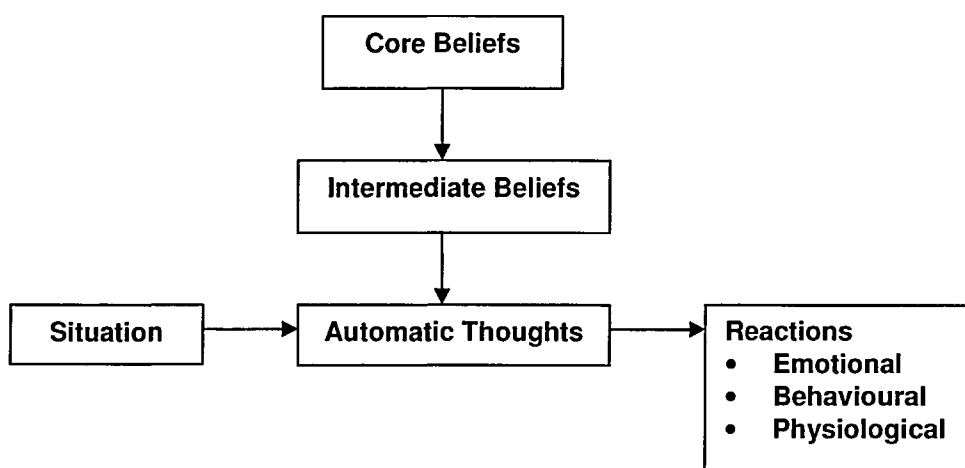


Figure 9.1 The Cognitive Model (Adapted from Beck, 1995)

To assist with the process of formulating cases, Beck (1995) has developed a cognitive conceptualization diagram, which can be used as a pro-forma to encourage therapists to gather appropriate information from their clients and make links between situational information and an individual's cognitions (See Appendix H). Alongside this, a reflective process is described, whereby the therapist considers the clients responses to the questions they are asked, and identifies the different types of information accordingly. Additional strategies such as the downward arrow technique (Burns, 1980), Socratic questioning and the use of dysfunctional thought records are also commonly employed to facilitate the identification of people's core and intermediate beliefs, and encourage clients and therapists to reflect on these and their relationship with the presenting problem(s).

Consequently, health and exercise professionals may benefit from a psychological formulation based approach, designed to encourage them to gather information related to what a patient's current sedentary behaviours are, how these developed, and how they are currently being maintained. According to the VCT, this would involve eliciting information about their underlying values; therefore the downward arrow technique may also be of some benefit. This involves a process of repeatedly asking patients the meaning of their cognitions to uncover important beliefs, and in asking the meaning of those, ultimately reveal their associated underlying core beliefs (Beck, 1995). Only, then can the exercise professional attempt to modify an individuals PA related beliefs and subsequent behaviours by revealing where value conflict lies and identifying cues which may help resolve it, in favour of positive PA related outcomes.

From a cognitive perspective, case formulation in PA behaviour change settings should identify the cognitions responsible for people's sedentary actions by revealing the underlying mechanisms and situational cues, which dictate the development of peoples PA related beliefs, attitudes and behavioural actions. In order to then use this information to encourage successful behaviour change, cognitive therapists attempt to modify this problematic or dysfunctional thinking (Beck, 1964). To achieve this, a range of techniques are commonly employed. Below are examples of a number of prominent cognitive therapy based techniques used to modify dysfunctional thinking, complete with suggestions for how these might be applied to PA behaviour changes settings.

9.3.2.1 Automatic or Dysfunctional Thought Records

Automatic or dysfunctional thought records allow clients to record, monitor, evaluate and respond to dysfunctional thoughts in written form (Bennett-Levy, 2003). Therefore, they can be used to encourage patients or clients to evaluate their own beliefs and reflect on the evidence for and against them (i.e. consider the advantages & disadvantages of the beliefs they hold). Specifically, clients are encouraged to write down their dysfunctional thoughts, the situations they occur in, any associated emotional responses, the evidence that supports those thoughts, the evidence that does not support them, and alternative thoughts or perspectives on the situation encountered (Padesky & Greenberger, 1995). This could be adopted by health and exercise professionals, within an intervention programme, to encourage patients to reflect on the thoughts associated with reluctance or participation lapses. For example, when a person encounters a situation which triggers a sense of reluctance towards being PA (e.g. going to the gym), they could be encouraged to fill out a thought record to reflect on why they are feeling reluctant (e.g. "I've got a stiff back from sitting at my desk all day, so perhaps I should rest it"). The thought record would then encourage them to write down evidence to support this thought (e.g. "When I had a back injury in the past, certain activities made it worse"), and evidence that does not support it (e.g. "I'm not actually injured just stiff" or "There are plenty of exercises I can do which will avoid putting unnecessary strain on my back"). This process might then encourage them to write down an alternative belief, which is more congruent with an underlying health related value, uncovered during the case formulation (e.g. "Some exercise may help me to loosen up & improve the state of my back after a long day at work").

9.3.2.2 Socratic Questioning or Guided Discovery

Socratic questioning or guided discovery to challenge a person's problematic thinking by uncovering relevant information outside of a client's current awareness and encouraging them to apply it to their beliefs (Padesky & Greenberger, 1995). Therefore, it may be a valuable skill for exercise and health professionals to be trained in, to encourage patients and clients to develop value congruent, beliefs, attitudes and behavioural actions. Specifically, the exercise or health professional may strive to demonstrate how specific values they possess are in fact congruent with PA participation. For example, a case formulation may reveal that experiencing personal competence is very important for a particular patient. In addition, that patient may possess the belief that they are physically incompetent because of the way they perceive their performances on exercises when they go to the gym. By using Socratic questioning the health professional may reveal that this is a direct response to the fatigue they experience after each exercise. By asking them, what else that fatigue could mean about the nature of their participation, the health professional might encourage the patient to realise that fatigue is also suggestive of their ability to work really hard at each exercise. Consequently, they develop an alternative belief, which is more congruent with their underlying competence related value (e.g. "I'm good at working hard").

9.3.2.3 Behavioural Experiments

Behavioural experiments refer to collaboratively designed behavioural tests, which aim to examine the validity of dysfunctional thoughts (Bennett-Levy, 2003). For example, in a PA behaviour change setting, a patient may express a belief that when they go to the gym they feel out of place and unwelcome because they perceive themselves to be considered an outsider. This is identified as being dysfunctional because the case formulation revealed that experiencing a sense of social acceptance is very important for that particular patient. Using guided discovery, the health professional may reveal that this belief stems from the way they perceive other people to be looking at them and not through any attempts to verbally communicate with the other exercisers. Therefore, to explore whether they really are unwelcome, the patient and health professional might agree that it would be a good idea for the patient to try and talk to some of the other exercisers, perhaps by asking for exercise related advice. If in doing this, the patient elicits positive responses from other exercisers, then this may lead to them developing alternative beliefs about the gym environment, which are more congruent with their underlying social acceptance related value. Alternatively, if their

beliefs are confirmed, then this will reveal to the health professional that further intervention is required to resolve this conflict.

9.3.3 Incorporating a Behavioural Perspective

Although the strategies described above should promote change via a process of altering people's problematic thinking, from a behavioural perspective they do not account for the potential that may be gained from manipulating situational or environmental factors. For example, the VCT developed in this thesis describes a process of interpreting different situational cues and identifies the underlying cognitive mechanisms involved. Therefore, as well as targeting a person's cognitions, interventions may also benefit from environmental manipulation. This is consistent with a behaviour therapy approach, where greater emphasis is placed on the identification and predictive power of more observable constructs (Hiltin & Piliavin, 2004). While such environmental manipulations are relatively common in PA behaviour change intervention approaches (See Chapter 2 for examples), they are rarely considered alongside cognitive strategies. To account for both the perspectives, clinical psychology and psychotherapy techniques have been developed that share a theoretical underpinning in both behavioural and cognitive psychology (Sheldon, 1995). These are generally referred to as Cognitive Behavioural Therapies (CBT).

An obvious advantage of combining cognitive and behavioural approaches can be seen by considering the behavioural experiment example presented in the previous section. In this example, the possibility of the behavioural experiment providing support for the dysfunctional belief in question was highlighted. Specifically, it was possible that the patient would confirm their beliefs about their particular gym being an unwelcoming environment. As a consequence of this, the health professional may also conclude that the gym is presenting them with situational conflict, which needs to be resolved by environmental manipulation. This could be achieved by directing the patient to a different exercise environment, which suits their social values more (e.g. a gym class containing like minded people or a walking club where they are given more opportunity to interact with others).

9.3.4 Practical Considerations

Despite the many potential benefits of case formulation and other cognitive and behavioural therapy related techniques, it is worth noting that such procedures are intended to be used by trained therapists equipped to deal with a range of psychological

issues. Persons (1989) explains that one role of case formulation is to help clinicians link a clients presenting problems in order to come to an understanding of the relationships between the difficulties. Therefore, it acknowledges that an individual's presenting problems may be linked to other underlying psychological problems. This is potentially problematic if it is considered a tool for exercise psychologists because it raises the possibility of uncovering issues, which an exercise professional may not be equipped to deal with. Traditionally exercise psychologists are not trained to deal with psychopathology related issues and health professionals attached to leisure providers tend to possess more of a physiological expertise.

Case formulation is also viewed as an evolving device, which provides an ongoing reference point for practitioners and patients throughout the therapeutic process (Grant, Mills, Mulhern & Short, 2004). This highlights the comparatively intensive nature of cognitive and behavioural therapies, which comprise multiple consultations often lasting for up to an hour at a time. Therefore, for such techniques to be implemented successfully in PA behaviour change settings, it would likely result in a significantly more labour intensive intervention process. Consequently, although the results of this thesis support a move towards more intensive ways of encouraging PA behavioural changes, in practice, this may be difficult to achieve without significant structural reforms. Specifically, it may be necessary for health authorities to consider the need for additional, more clinically trained roles within their PA promotional structures. This may include the provision of training (or continuing personal & professional development: CPD) activities for existing PA/health promotion workers, in skills more commonly adopted in applied clinical psychology settings.

According to the British Association for Behavioural and Cognitive Psychotherapies (BABCP), training in cognitive and behavioural therapy techniques will usually involve being first trained in a core profession such as clinical psychology, nursing, medicine counselling or social work, and then specialising in CBT by gaining a recognised CBT qualification (BABCP, 2007). Consequently, many of the existing professionals who work in PA promotion (e.g. leisure providers or PARS coordinators), may not be trained in a recognised core profession and as a result will not be eligible for further CBT related training. In addition, those that are eligible (e.g. practice nurses, GP's) are faced with having to complete an intensive diploma or similar academic qualification involving a considerable number of training hours and supervision. According to BABCP (2007), these courses generally last for between 18 months and 2 years on a part time basis and can cost over £6000. Therefore, it would be a time

consuming and potentially expensive process for health authorities to train PA health promotion workers in these skills. Finally, while short courses or workshops (often only 1 or 2 days in length) in related techniques are often offered, the appropriateness of these has also been called into question. Specifically, it has been argued that such courses are insufficient to train clinicians and health professionals adequately, often leading to increases in practitioner confidence but not necessarily competence (Miller & Mount, 2001). Therefore, considerable practical and financial barriers appear to exist in opposition to these proposed reforms to applied PA behaviour change practices.

9.3.4.1 Working with Current Mental Health Initiatives

Although current practices in exercise psychology (& the infrastructures within which they operate) may not be conducive to supporting the type of intervention reforms highlighted previously, better links between more mainstream psychological services and PA promoting bodies may go some way to addressing these issues. For example, within mainstream psychology, a recent move can be observed towards making psychological therapy and support services increasingly available to a wider population group. Specifically, in response to a recent report published by the Centre for Economic Performances mental health policy group (2006), which identified a lack of available psychological services, the Improving Access to Psychological Therapies programme (IAPT) was initiated.

The IAPT programme was set up to provide increased access to psychological therapies for people suffering from depression and anxiety disorders (Care Services Improvement Partnership: CSIP, 2008). It aims to provide a service which involves a primary care referral system, whereby patients can be referred to a team of therapists who are equipped to deliver differing intensities of intervention based on an assessment of an individual's presenting problems (CSIP, 2008). It is also intended to be an integrative service, whereby links are available to other support services/sources of information (e.g. employment or housing services). Consequently, the IAPT initiative may provide a potential infrastructure, within which those seeking to change their PA or health related behaviours, can receive an appropriate level of support. For example, while IAPT is currently aimed at depression and anxiety disorders, in the future it could also target health related behaviour modification such as PA behaviour change. This would allow a primary care health professional to refer a patient (who needs to increase their PA habits) to a therapist who would be able to conduct an in-depth assessment (case formulation) of the patient, to determine the origins, development and

maintenance of their sedentary behaviour. Depending on the outcome of this process, the integrative nature of IAPT, would then allow for an appropriate therapy or treatment plan to be devised. This may involve continued CBT related procedures (of an appropriate level of intensity for that individual) and/or referral to a leisure provider for instructional and informational expertise. Therefore, IAPT would allow for more individualistic PA interventions, which address the underlying cognitions identified by the GTM study conducted in this thesis.

A potential problem of incorporating an additional patient population into IAPT, is that it will increase the burden on the resources and therapy services provided. However, part of the IAPT initiative is to encourage those with relevant skills to train as IAPT workers (IAPT, 2008). For example, as well as certified mental health professionals (e.g. clinical psychologists, psychotherapists), the initiative recognises that other professionals such as occupational therapists, social workers or counsellors also possess expertise in the provision of psychological therapies. Consequently, they are encouraged to undergo additional training which will enable them to work within the IAPT scheme, in a capacity that is appropriate for the skills they possess. The IAPT programme facilitates this by providing patients with a stepped care system, whereby a distinction is made between high and low intensity interventions (CSIP, 2008). This allows for a more appropriate use of resources because therapist skills are matched to the appropriate intervention intensity required for each patient. While high intensity workers represent people with a considerable background in mental health or the provision of psychological therapies, low intensity workers are recruited from a wide range of backgrounds, providing they can demonstrate a special interest or relevant skills in the delivery psychological therapies (IAPT, 2008). Consequently to reduce the burden on this system, existing PA promotional workers (e.g. gym instructors, PARS coordinators) may also be eligible to train as lower intensity IAPT therapists.

9.3.5 Summary of Implications for Practice

While the results of this GTM study appear to offer a unique theoretical insight into the PA behaviour change process, many of the implications for practice discussed already seem to be gaining some recognition. Specifically, there is evidence to suggest the emergence of a new field; that of 'clinical' sport and exercise psychology. For example, in 2004 a division of sport and exercise psychology was formed within the British Psychological Society (BPS) in response to an increase in the academic status and public recognition of these fields. More recently, the *Journal of Clinical Sport*

Psychology was launched to promote an understanding of theory, practice and empirical findings relating to the integrated practice of clinical, counselling, and sport psychology, emphasizing the integration of empirical research and direct psychological service delivery spanning a wide range of clients and settings (Gardner, 2007). In addition, within the exercise psychology literature, there is a considerable body of research evidence demonstrating the mental health benefits of PA (e.g. Fox, 1999; Richardson, et al., 2005) and the benefits that psychological therapies can have on people's physical health (e.g. Martin, Rauh, Fichter & Rief, 2007; Morley, Eccleston & Williams, 1999). Consequently, applied practices within the areas of PA promotion and mental health are likely to benefit from greater level of integration. This thesis adds considerably to this emergent field of clinical exercise psychology by not only presenting empirical evidence to support the need for significant applied practice reforms, but by also identifying a potentially workable solution to achieving this. Specifically, by utilising mental health services such as IAPT initiative, PA and other health related behaviour change interventions may be significantly enhanced.

9.4 Chapter Summary

This chapter has demonstrated that the results generated from the three studies that comprise this thesis, raise important applied implications from a number of practical perspectives. First, from a research perspective, a number important considerations for GTM based theory generative research practices, were highlighted. Specifically, this thesis has revealed a number of key GTM characteristics, which should be evident in all GTM based research (Hutchison, Breckon & Johnston, in press A). In addition, to encourage grounded theorists to acknowledge those characteristics and remain within a GTM framework, regardless of their epistemological standpoints, a range of more practical techniques and procedures are also discussed. To encourage accurate applications of theory to practice, this thesis also reveals a number of limitations with current theory based interventions (Hutchison, Johnston & Breckon, in press A). By acknowledging these, future intervention developers are encouraged to more accurately represent their chosen theoretical underpinnings. Finally, the theoretical model developed in this thesis, was discussed in terms of its practical implications for intervention strategies. Ultimately, in recognition of the fact that the VCT conveys PA behaviours to be the result of interactions between situational factors and personal values, a call was presented for interventions to be individualistic enough in nature to account for differences in people's underlying orientations. Consequently, a range of

strategies which allow for the elicitation of values and subsequent intervention tailoring were discussed. Central to these was the need to include value centred needs assessment phases within intervention protocols, before considering what cognitive and or behavioural intervention strategies might be most appropriate for the individual involved. From a practical perspective, this may be achieved if better links are forged between more mainstream psychological services and PA promoting bodies.

Chapter 10: Final Conclusions – Author Reflections, Limitations and Future Research Directions

10.1 Introduction

As explained in Chapter 4 of this thesis, after reflecting on my ⁷ own epistemological and theoretical standpoint, I adopted a constructivist stance towards my use of GTM to investigate successful PA behaviour change. As a result, I do not believe that my own values and assumptions can truly be set aside as objective scientists generally aim to do (Thomas et al., 2005). Consequently, I have tried to make clear my involvement in the GTM process throughout and ultimately convey that the grounded theory presented in Chapter 8 is the result of this. The purpose of this chapter is to reflect on my own research journey and in doing so provide insight into how my background, interests, experiences etc. might have acted as important determinants of both the processes involved and outcomes of this research endeavour. Finlay and Gough (2003) explain that this reflective process encourages researchers to adopt a critical evaluative stance towards their work. Consequently, this chapter reflects on the following issues and key decisions: the decision to adopt GTM to address the research question presented in this thesis; how the thesis evolved to include a strong methodological component; how I had to adapt to my own ways of working to meet the requirements of GTM and the many uncertainties I experienced as a result; and ultimately how this process has contributed to my own development. As part of this reflective process, a number of potential limitations are highlighted and suggestions for future research generated. In presenting and discussing these reflections, this chapter compliments the thesis by providing valuable contextual information relevant to many of the processes described, and by demonstrating my own development as an independent researcher.

10.2 My Orientation to this Thesis

Prior to embarking on the doctoral research documented in this thesis, I completed an undergraduate degree in sport science and a masters degree in sport and exercise psychology. Initially, the decision to embark on this course of study was influenced by the fact that I have always been an active participant in a number of sporting activities. As a child, I was encouraged to take part in PA related pursuits and

⁷ Because this chapter reflects on the research journey of the principal researcher, the first person pronoun is adopted throughout this chapter.

as a result was among the 71% of young males reported to be meeting government PA guidelines during the mid nineties (Prescott-Clarke & Primatesta, 1998). Therefore, PA related pursuits represented an important part of my life, and continue to do so. Because of this, after completing my school based education, I decided to embark on further academic studies within the field of sport and exercise science and ultimately, exercise psychology. As explained in Chapter 4, the GTM adopted in this thesis is informed by the constructionist epistemological viewpoint but is ultimately representative of a constructivist paradigm. From this perspective, it is acknowledged that objects cannot be interpreted without an observer, who can never fully be detached from culture and past experience when giving meaning to that object (Burr, 1995). Consequently, by describing my own background in PA participation, I am providing some insight into the perspective from which the interpretations or theoretical renderings described in this thesis occurred.

In addition to my background in sport and PA participation, my academic research training also had an impact on my journey as a doctoral student. As a rationale was developed for the research described in this thesis, it became evident that the exploratory nature of the research question may require an alternative research approach to those which I was originally trained in. Until embarking on the GTM journey described throughout this thesis, my research background was representative of a dominant objectivist epistemology within sport and exercise science, which favours positivistic and post-positivistic approaches (Vealey, 2006). Consequently, my understanding of interpretative research practices was extremely limited due to considerable philosophical naivety on my part. However after discussions with a supervisory team, I soon realised that many of the arguments I was presenting to communicate the limitations of previous theoretical understandings of PA behaviour change (Chapter 2), were related on a philosophical level. For example, the explanatory power of a number of previous theoretical accounts was questioned on the grounds that they possessed limited ecological validity or theoretical depth. Specifically, where a theoretical account was developed and tested in an alternative behaviour change context then applied to a PA context, it was argued that this could be viewed as restricting theory development because it only allows for pre-existing theoretical constructs to be tested. This process represents a positivistic research practice whereby pre-defined hypotheses are examined using measurable, testable constructs (Thomas et al., 2005). Therefore, because I felt it was important to allow for the identification of PA behaviour change specific theoretical observations, the decision to adopt GTM felt very logical

once I had reflected on my own epistemological assumptions and the nature of the research question identified.

Having made the decision to adopt GTM, I found myself constantly facing uncertainties with regards to the techniques and practices I was adopting. For example, when sampling for potential interview participants, I had to set aside the positivistic principles I had previously followed and attempt to sample for theoretical development instead of population representativeness (See Chapters 5 & 6). I also worried about the academic credibility of my results in light of the absence of any probability statistics. However, I feel that ultimately these uncertainties, generated by my positivistic (& post-positivistic) traditions or background, contributed positively to many aspects of this thesis by encouraging me to constantly reflect on and question the different stages of the research process. As a consequence, I continually felt the need to justify my decisions to present a transparent account of my actions.

On reflection, the decision to embark on the methodological strand of this thesis can also be traced back to my positivistic roots. As explained in Chapters 4 and 5, GTM has been interpreted and described in a variety of ways based on different epistemologies and theoretical viewpoints. Consequently, as a novice user of GTM, I was presented with a wealth of seemingly contradictory information regarding how to conduct GTM based research. Because I was used to working with clearly definable relatively systematic approaches, I felt quite uncertain about many of the decisions I would need to make throughout the course of my studies. As a result, I was concerned about how the quality or rigour of my research activities would be judged, particularly in light of some relatively recent publicised concerns regarding the quality of current GTM applications (e.g. Charmaz, 2003; Bringer et al., 2004). My early research training had always taught me that scientific research is judged based on its validity, reliability and generalisability (Vincent, 2005). However, I soon realised that this criteria cannot possibly be applied to the wide range of epistemological and methodological approaches used within the qualitative research domain. This fuelled my research interests in GTM quality or rigour and the subsequent investigations conducted in this thesis as a result (Chapter 5).

As the methodological research reported in Chapter 5 developed, I became increasingly aware of the potential for my work to undermine the epistemological debates within GTM. Specifically, I worried that my desire to present evidence of methodological rigour could be interpreted as an attempt to apply a positivistic overlay on GTM research designs. These worries appeared to represent a shift in my own

perspective and identity as a researcher, whereby I was beginning to embrace and appreciate the philosophical debates linked to GTM. However, having started out as a novice user of GTM, I remained acutely aware of the challenges faced by an increasing number of aspiring grounded theorists. Consequently, although my theoretical perspective developed throughout my doctoral research, the original uncertainties I experienced as a result of my early research training, remained the driving force behind the methodological strand of the thesis. Therefore, the decisions I made in Chapter 5 were heavily influenced by my own orientation towards this thesis. However, as a result, I feel a number of pertinent methodological research issues within GTM and exercise psychology have been explored.

10.2.1 The Influence of the Supervisory Team Members

Although this thesis represents an account of my own research activities of the last three years, as with any PhD, this process involved considerable input and guidance from an academic supervisory team. Consequently, while the procedures and practices described ultimately occurred as a result of my own decisions, this decision making process often involved consultation with one or both of my PhD supervisors. Therefore, my supervisors represented a significant part of the constructivist process described in this thesis. As explained in Chapter 5, grounded theorists should strive towards achieving explanatory depth within their work. Therefore, a process of theorizing to achieve 'theoretical sensitivity' is key to all GTM designs (Glaser 1978). Charmaz (2006) explains that to achieve such theoretical sensitivity grounded theorists are encouraged to look at the studied phenomena from multiple vantage points, make comparisons and follow leads, in order to build on previous ideas. Consequently, by involving my supervisors in the process, I was actively encouraging a knowledge construction process, which took into account multiple perspectives. Initially, I found this process difficult to manage because I often received seemingly conflicting information due to the sometimes differing orientations of my two supervisors. However, on reflection I think this encouraged me to adopt a more critical stance to the decisions I was making, forcing me to present justification for my decisions which acknowledged multiple perspectives or vantage points.

10.3 Reflections on Thesis Structure

Despite the fact that the primary research objective of this thesis was to advance theoretical understandings of successful PA behaviour change, a substantial proportion

of my time was devoted to conducting two systematic review based studies. This often felt like it detracted from my primary objectives and provided a somewhat unorthodox structure to the thesis. Specifically, throughout these doctoral studies, I was affiliated with the Sport and Exercise Science department at Sheffield Hallam University. Although the research question I had devised was extremely relevant to this research environment, for the reasons described in the previous section (i.e. relating to a dominant objective epistemological position), the methodological approach I was following was relatively unusual. As a result, the structure of my thesis (i.e. two review based studies and one larger empirical investigation) may be viewed as somewhat unconventional. However, I have since realised that as original contributions to knowledge, the review evidence presented represents a key component of this thesis. They also ultimately informed and guided the subsequent empirical section of the thesis.

10.4 Reflections on the Grounded Theory Process

10.4.1 Research Ethics

Research ethics represent an important consideration for anyone undertaking any sort of research endeavour. This is particularly true of doctoral students who through their work, aim to demonstrate their competence as independent researchers. To stress the salience of research ethics, in 2006 the Economic and Social Research Council (ESRC: 2006) declared that they will only fund research where appropriate consideration has been given to ethical implications. Due to the exploratory nature of GTM, when I attempted to meet research ethics requirements for this study, I was faced with a considerable challenge. Specifically, in order to approve study protocols both university and NHS ethics committees require detailed information regarding intended research protocols. As a result, I was forced to anticipate a number of potential sampling options which I may need to explore throughout the course of my studies. This resulted in me receiving ethics approval to contact and interview both health professionals and referral patients, and if necessary recruit through primary care settings (i.e. GP surgeries). Fortunately, this easily accounted for the theoretical sampling conducted throughout this thesis. However, this remains a potential obstacle for aspiring grounded theorists, who may have to make multiple ethics approval applications as a result.

10.4.2 The Role of Previous Literature

As explained in Chapter 8, the role of previous literature is the subject of considerable debate within GTM. One of the strengths of GTM is its ability to generate

theory which is grounded in relevant data. However, because of the epistemological debates surrounding GTM, the manner of this theory generation process remains a source of considerable contention (See Chapter 4). This includes the role of previous literature and its potential impact on GTM development. Early GTM texts extol the importance of setting aside previous understandings and conducting a literature review after developing an independent analysis (Glaser & Strauss, 1967; Glaser, 1978; Strauss, 1987). However from a constructivist perspective, past and present involvements are acknowledged as part of the grounded theory construction process (Charmaz, 2006). As someone who had graduated from a sports science degree and a sport and exercise psychology master's degree, my knowledge of the PA behaviour change literature was relatively extensive. As a result, it is likely to have had an impact on my interpretations of the emergent data. Further to this, as explained in Chapter 8, much of rationale for embarking on this GTM study was based on a critique of previous literature. Consequently, I was very conscious of the need to present a transparent account of my theoretical development and any use of literature, in order to convey clear links between the data collected and theory generated. On reflection Chapter 8 does present some additional evidence to support the grounded nature of the findings, because a considerable original body of literature is discussed.

10.4.3 Conducting In-Depth Interviews

Prior to embarking on this doctoral research, my experience at conducting in-depth interviews was relatively limited. Therefore before conducting any interviews, I was trained in reflective listening and qualitative interviewing techniques and certified competent by a member of my supervisory team. After each interview, as a matter of routine, I would re-play each recording and reflect on the interview process. This not only helped me to make early analytical observations but also encouraged me to critique my own interviewing skills. As a result of this reflective process, I feel that I developed considerably as a research interviewer. However because of this, my abilities to explore, reflect on and elicit further insight into people's responses, were far greater at the end of this GTM process compared to the start. Consequently, there was a reasonable amount of variation in the richness of the data collected at different times throughout the study. However, as explained earlier in Chapter 5, grounded theorists are encouraged to continue sampling until theoretical saturation has been achieved (Corbin & Strauss, 2008). Therefore, the variation described above probably only served to prolong the data collection process.

A potential limitation associated with conducting any research that involves human participants reporting on their own experiences concerns the potential for participants to respond in a socially desirable manner (Reynolds, 1982). For example, if a person is asked to report on their ability to maintain regular PA participation, they may be reluctant to admit to having difficulties because such difficulties might be associated with public perceptions of laziness. Consequently, participants in this study may have failed to disclose such difficulties or exaggerated their PA participation habits to enable them to reflect socially desirable outcomes. However, due to the exploratory (non-confrontational) questioning style adopted, I felt that after each interview a fairly accurate representation of each participants PA habits had been obtained, even if it didn't reflect what they had reported during the recruitment process. Therefore, while social desirability bias may have been evident in people's responses to the recruitment telephone calls and subsequent PA questionnaires (Appendix A), the interview process allowed for a more accurate representation of their PA habits to be elicited. This was evident from the data because I ended up differentiating between different levels of PA participation stability (See Chapter 7, Section 2.2) to account for those who were perhaps more reluctant than they had originally reported. Consequently, in future research designs attempts to include social desirability instructions at all stages of the recruitment process (i.e. during the initial telephone conversation and in the PA questionnaire) should be considered. However despite this potential limitation, research evidence has demonstrated that social desirability bias is not closely associated with self-reported PA levels (Motl, McAuley & Di Stefano, 2005).

Table 6.1 (Chapter 6) demonstrates that although all 21 participants took part in a similar interview process, considerable variation can be observed in the length of each interview. This variation reflects the willingness of each participant to discuss their own experiences, the range of topics covered and the depth of discussion achieved. Consequently, the extent to which each interview ultimately contributed to the final explanatory account was potentially highly variable. However, the iterative nature of GTM does control for such variations, because theoretical sampling should continue to dictate the data gathering process until saturation is achieved (Charmaz, 2006). For example, on some occasions participants were less forthcoming or I felt I had missed opportunities to reflect on and ultimately elicit further information from them. However, in these instances I was able to either re-contact participants and invite them for further interview, or include more specific lines of enquiry in subsequent interviews if relevant topic areas re-emerged. Therefore, the flexible nature of GTM does control for the

variable status of different interviewee accounts by allowing the sampling process to respond accordingly to different interviewee characteristics.

A further limitation commonly associated with conducting in-depth interviews concerns the potential for the process to neglect certain elements of the interviewer-interviewee interaction (Potter & Hepburn, 2005). As explained in the methods (Chapter 6), throughout the course of this GTM process each interview was transcribed verbatim and then imported into NVivo for further analysis. Therefore, the transcripts created were effectively word for word accounts of each verbal exchange that took place. These *orthographic* accounts have been criticised for not capturing all relevant elements of the interaction, such as the use of intonation to convey additional meaning (Potter & Hepburn, 2007). Consequently, it could be argued that there is considerable scope for miscommunication to occur between the analyst and the interviewee, when working from these types of transcripts. To control for this, future researchers may benefit from adopting more complex transcription methods, such as Jeffersonian transcription (Jefferson, 1985). These contain additional annotation and style alterations to represent specific conversational features not contained in an orthographic transcript. However, because of the iterative nature of GTM, each interview was transcribed and analysed within a few days of it being conducted. As a result the conversation was always relatively fresh in my mind and additional interactional features were often recorded as annotations within NVivo. Therefore, the extent to which this potential limitation applies to the current study may be reduced as a result of its iterative design and use of CAQDAS.

10.4.4 Reflections on the Nature of the Final Model

In order to assist with the evolving grounded theory development process, visual representations or models were created to depict and summarise the emergent theoretical observations. As explained in Chapter 6 (Section 6.5.7), this process helped me to manage the iterative theory building process by assisting with the conceptualisation of increasingly complex observations. By reviewing the summary models created (Figures 7.4, 7.5, 7.9 & 7.10) and the final model (Figure 8. 1), it was possible for me to reflect on the observations I was making and the ways I was conceptualising those. By exploring these retrospectively, I have come to realise that although I presented my findings as an alternative to the social cognition models described in Chapter 2, many of the models I created do reflect characteristics from these. For example, in both models 7.9 and 8.1, much of the terminology adopted can be

found in TPB and self-efficacy theory (See Chapter 2, Section 3). Therefore, despite setting out to counter these theoretical approaches, my own theoretical renderings appear to have been heavily influenced by them. Consequently, it may be more appropriate to describe the final model (Figure 8.1) as an “extension” to previous social cognition models as opposed to an “alternative”, because it does share many similarities with these approaches.

10.4.5 Presenting and Communicating my Findings

Throughout, the course of this thesis I was actively encouraged by my supervisory team to present my work to academic audiences and write completed work up for publication. This proved a valuable process as feedback from peers helped, to not only advance my academic understandings and the overall quality of my work, but also gave me confidence in my own research approach. I also struggled with the idea of writing in the first person, as I had always been led to believe that this is not good research practice. However, there are increasing calls for a shift away from the traditional notion that academic writing is an impersonal practice, towards greater recognition of the writer's presence (e.g. Fulbrook, 2003; Tang & John, 1999). This is particularly pertinent for research that seeks to actively acknowledge the meaning making capacity and interpretative influence of the researcher/s involved. Consequently, although I found it difficult to write using the first person pronoun, in order to convey my constructivist stance and present a transparent account of the research process, it was necessary for me to write Chapter 7 and sections of Chapter's 6 and 8 in the first person. Arguably, to truly acknowledge my epistemological position or identity as a researcher, the entire thesis should have been written in this way (Tang & John, 1999). However, I feel that switching between writing in the first and third person helped to both emphasise the constructivist epistemological position, and demonstrate its significance within the GTM process.

10.4.6 What Would I Do Differently?

It is clear from the reflections described in this chapter, that throughout my PhD studies, I experienced many doubts or insecurities regarding my academic abilities. In retrospect, it is very easy to think how I might have done things differently or made more appropriate decisions along the way. However, I am regularly reminded by more senior academics that a PhD represents a research apprenticeship (e.g. Professor E.M. Winter, personal communication, April 8, 2008), and on reflection, I realise I have

learned a great deal during the last few years. Therefore, to list a number of things I would do differently, could arguably serve to devalue this process. However, I have undoubtedly learnt a number of experiences that will contribute to my future research work. First, I have become considerably less philosophically naïve in my approach to research. As a consequence, I feel in a better position to critique and evaluate different ways of working. Second, my confidence in handling qualitative data has increased, in that I am more willing to pursue emergent themes even if they contradict previous understandings. Finally, I have a far greater appreciation for the potential timescales involved in qualitative data analysis and more specifically a GTM process.

10.4.7 CAQDAS: Something I Would Do Again

The reflections outlined in this chapter also provide additional justification for many of the decisions made throughout the thesis, confirming their importance within the research process (e.g. the decision to adopt GTM, the sampling strategy adopted, presenting findings along the way). In addition to these, my use of CAQDAS is also something I would advocate. This is demonstrated in Chapter's 5, 6 and 9 which all contribute to demonstrate the benefits of QSR-NVivo, not only for the purposes this research study but also for the wider GTM research community. Due to limited literature on the use of CAQDAS in conjunction with GTM based studies; this in itself represents an additional unique contribution to knowledge demonstrated by this thesis, particularly in light of recent calls for graduate students to receive training in CAQDAS based approaches (Fielding, 2007). Therefore, although I had to invest a considerable amount of time and effort into developing my QSR-NVivo skills, I feel that this process was extremely valuable for a number of aspects of this thesis and my ongoing development as an independent researcher.

10.5 Re-Evaluating my Own Epistemological Stance

Early in my PhD journey, I was encouraged by my supervisory team to reflect on my own epistemological stance by exploring a number of different philosophical positions (Chapter 4). As a consequence, alongside reviewing much of the theoretical literature (within exercise psychology), I was also trying to explore some of the philosophical debates and positions that underpin different research practices. I soon realised that many of the criticism I had regarding this body of theoretical literature and the limitations I'd uncovered, were related on a philosophical level. This resulted in me voicing dissatisfaction with the seemingly dominant positivistic and post-positivistic

practices, which were evident within exercise psychology. Consequently, I felt I had uncovered a need to adopt a more interpretative stance in order to allow for a research approach that engages with the subject matter, allowing for more ecologically valid explanatory accounts to be developed. Specifically I felt that in order to understand this human change process, it was necessary to explore people's experiences and perceptions of this. By acknowledging the role of these experiences or perceptions in the meaning making process, I was effectively moving away from objectivism and embracing more of a constructionist position.

However, although throughout the course of this thesis I describe adopting a constructivist approach to my GTM work, this chapter has demonstrated that my original post-positivistic research training is evident as exerting influence throughout the course of this thesis (See Section 2 - Reflections on my orientation to this thesis; and Section 4.4 - Reflections on the nature of the final model). Therefore, based on the reflections presented in this chapter, my current epistemological position and theoretical perspective appears to fit somewhere between objectivism and constructionism or constructivism and post-positivism.

10.6 Future Research Opportunities

Throughout the course of this thesis a number of future research opportunities have been uncovered. These reflect both its theoretical and methodological focus. From a theoretical point of view, the empirical research conducted in this thesis led to the development of an explanatory model of PA behaviour change (the VCT). A fundamental component of the model is an underlying core belief or value system. This dimension of the model is hypothesised to interact with different life situations and sources of information, to determine a person's more immediate PA participation related beliefs and attitudes and ultimately their ability to change their PA habits and maintain those changes. Consequently, the theoretical implications and secondary literature review (Chapter 8, Section, 4) included considerable discussion on existing human value theories (e.g. Rokeach, 1968, 1972; Schwartz, 1992). As explained in Chapter 8, no attempts have been made to explore these theories within exercise psychology. Therefore, there is scope for exploring the validity of the 10 cross-cultural values identified by Schwartz (1992; Chapter 8, Figure 8.2) within and across a number of PA behaviour change related populations (e.g. PARS attendees; sedentary populations; regularly active populations). If these distinct values do account for such populations, then the motivational consequences of possessing different value priorities could then

be explored using existing validated measures such as the portrait value questionnaire (Schwartz et al., 2001) or Schwartz's (1996) value survey. This may result in further development of the VCT, enhancing its explanatory or predictive power.

From a methodological perspective, the review evidence presented in Chapter 5 highlighted a number of limitations with existing GTM based research in exercise psychology. Specifically, many applications of GTM demonstrated a poor understanding of the methodology or failed to present an adequate account of the research process. While this study was restricted to GTM applications within exercise psychology, its implications are relevant to the wider GTM research community. Therefore, as GTM becomes an increasingly popular form of enquiry across a range of academic disciplines outside of sociology; such as psychology (Charmaz, 2003), nursing (Schreiber & Stern, 2001), business (Goulding, 2002) and sports psychology (e.g. Holt & Dunn, 2004), there is considerable scope for a wider evaluation of its use. This could be achieved by adopting the assessment criteria developed within this thesis (See Chapter 5 or Hutchison et al., in press A).

10.7 Final Summary

The primary aim of this thesis was to advance current theoretical understandings of long term PA behaviour change in order to encourage the development of more effective applied practices or intervention strategies. Ultimately, the results presented in Chapters 7 and 8 represent an alternative theoretical account of the PA behaviour change process, which emphasises the role of peoples underlying values as key behavioural determinants. Based on these findings, considerable intervention reforms are proposed in Chapter 9, which centre on the need for increasingly individualistic applied practices. To achieve these outcomes, a GTM approach was adopted throughout. This occurred in response to criticisms surrounding current theoretical models and their development/origins (Chapters 2 & 3). Adopting GTM allowed for the development of a more ecologically valid explanatory model grounded in data representative of the PA behaviour change process. Consequently, I am confident that the primary aims of the thesis have been met.

Alongside the GTM based study described in Chapters 6 to 8, this thesis also responded to recent calls for greater research rigour or attention to research quality in applications of GTM (Bringer et al., 2007; Charmaz, 2003). Specifically, Chapter 5 reported on a critical review of GTM applications within exercise psychology, which highlighted a number of shortcomings regarding current research designs. This review

process involved the identification of a number of key GTM characteristics, which if acknowledged by aspirant grounded theorists, should assist them in ensuring that their research remains true to the tenets of GTM. Consequently, alongside the theoretical advancements described in the previous paragraph, this thesis also highlights a number of potentially valuable research implications or methodological contributions.

This reflective chapter has given me the opportunity to step back and evaluate my own development since embarking on this PhD journey. It has also allowed me to declare details about my own background which might have influenced my interpretation of the data and many of the decisions relating to the direction of this thesis. Ultimately I believe that a considerable strength of this thesis concerns the fact that it began with a very broad scope, allowing it the freedom to respond to emergent gaps in the literature. As a result it has generated a number of unique contributions to knowledge from a theoretical and methodological perspective, which should go on to inform future applied exercise psychology and research related practices.

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ProActive: Long Term Follow Up

Introduction:

This questionnaire has been distributed to assess the long term effectiveness of the ProActive scheme. The following questions are designed to find out about your current physical activity habits. There are no right or wrong answers, so please answer the questions as honestly and accurately as possible.

Question 1: How physically active are you?

Please think carefully about the physical activity that you do at home, at work and during free time, over the past four weeks.

During an average week how many times would you normally do the following for more than 15 minutes (Please insert a number in each relevant box)?

- Vigorous activity, e.g. jogging, vigorous swimming, football, hockey, heavy lifting and carrying, hill walking at a brisk pace, aerobics and cycling, if out of breath and sweaty.
- Moderate activity, e.g. walking at a brisk pace, football, swimming, tennis and cycling, (if not out of breath or sweaty), social dancing(if out of breath) heavy gardening or housework.
- Light activity, e.g. walking at an average or slow pace, light DIY, housework, table tennis, golf, social dancing (if not out of breath), bowls, fishing or snooker.

Appendix B: Participant Recruitment Letter

Sheffield Hallam University
Collegiate Crescent Campus
Sheffield
S10 2BP

Tel: 0114 2255582
Email: a.hutchison@shu.ac.uk

<<Insert Date>>

<<Insert Name>>

<<Insert Address Line 1>>

<<Insert Address Line 2>>

<<Insert Address Line 3>>

<<Insert Post Code>>

Dear <<Insert Name>>

Thank you very much for agreeing to help us with our research. As explained over the phone, this letter contains further information about the research we hope to conduct.

The Centre for Sport and Exercise Sciences at Sheffield Hallam University and Somerset primary care trust are currently conducting research designed to investigate the processes involved in physical activity behaviour change. By developing a better understanding of how people successfully change their physical activity habits, researchers should be able to develop better interventions to help support and encourage patients to improve their health by increasing their physical activity levels.

Our records show that you successfully completed the ProActive exercise referral scheme in <<Insert Date of Completion>>. You indicated on the telephone that you are still physically active. As a result we feel that your experiences may provide valuable insights into how people successfully change their physical activity habits and manage to maintain those changes. To develop a better understanding of how people successfully change we would like to conduct a telephone interview with you in order to discuss your experiences of change.

For more information about the interview process see the attached participant information sheet. This letter also contains a consent form and a very short physical

activity questionnaire. If you could fill in both the consent form and the questionnaire and send them back in the pre-paid envelope provided we would be very grateful. Once we have received these, we will re-contact you by phone to arrange a convenient interview time.

If you would like more information, please feel free to contact Andrew Hutchison on 0114 225 5582 or a.hutchison@shu.ac.uk

I look forward to your contribution to this study.

Yours Sincerely,

Andrew Hutchison
Research Centre for Sport & Exercise Sciences
A211 Collegiate Hall
Collegiate Crescent Campus
Sheffield Hallam University
S10 2BP

Appendix C: Participant Information Sheet



Sheffield Hallam University

**Faculty of Health and Wellbeing Research Ethics Committee
Sport and Exercise Research Ethics Operating Group**

Participant Information Sheet

Project Title	Understanding Physical Activity Behaviour Change: What are the Processes Involved?
----------------------	--

Director(s) of Studies	Dr Lynne Johnston (lynne.johnston@newcastle.ac.uk), Dr Jeff Breckon (j.breckon@shu.ac.uk)
-------------------------------	---

Principal Investigator	Andrew Hutchison (a.hutchison@shu.ac.uk)
-------------------------------	---

Principal Investigator telephone/mobile number	0114 225 (5582)
---	-----------------

Purpose of Study and Brief Description of Procedures

The purpose of this study is to examine the processes involved in PA behaviour change. If you have volunteered to participate in this study then you should:

Have successfully completed a physical activity referral scheme 4 or more years ago and are still regularly physically active.

Your participation in this investigation will involve at least one telephone interview designed to explore your experiences of PA behaviour change. Interviews will consist of open ended questions designed to give you the opportunity to express and discuss your experiences as openly as possible. Interviews will be conducted by the principal investigator and will be arranged at a convenient time for you. Interviews are anticipated to last for between 30mins to 1 hour. It is possible that you will be asked back to subsequent interviews in order to explore issues that emerge as this research develops. However, participation in any of the interviews is optional, you will not be obliged to answer any questions you do not want to and you can stop participation at any time.


All interviews will be tape recorded in order to allow the information to be transcribed and analysed at a later date. Data will be stored on a secure computer at Sheffield Hallam University and password protected. Tape-recordings of interviews will be stored in a locked filing cabinet in a secure office. Data will only be kept for the duration of the study. In order to ensure anonymity, participants will be given an ID number and all interview transcripts will be stored under this ID number.

Before participating in this investigation you will be asked to complete a consent form.

If you require any further information about this study, please contact the principle investigator outlined above.

It has been made clear to me that, should I feel that these Regulations are being infringed or that my interests are otherwise being ignored, neglected or denied, I should inform Professor Edward Winter, Chair of the Faculty of Health and Wellbeing Research Ethics Committee (Tel: 0114 225 4333) who will undertake to investigate my complaint.

Appendix D: Informed Consent Form

	<i>Sheffield Hallam University</i>
Faculty of Health and Wellbeing Research Ethics Committee Sport and Exercise Research Ethics Operating Group	

INFORMED CONSENT FORM	
TITLE OF PROJECT: Understanding Physical Activity Behaviour Change: What are the Processes Involved?	
The participant should complete the whole of this sheet himself/herself	
Have you read the Participant Information Sheet?	YES/NO
Have you had an opportunity to ask questions and discuss this study?	YES/NO
Have you received satisfactory answers to all of your questions?	YES/NO
Have you received enough information about the study?	YES/NO
Who have you been in contact with?..... Do you understand that you are free to withdraw from the study: <ul style="list-style-type: none">• at any time• without having to give a reason for withdrawing• and without affecting your future medical care	YES/NO
Have you had sufficient time to consider the nature of this project?	YES/NO
Do you agree to take part in this study?	YES/NO
Signed Date (NAME IN BLOCK LETTERS).....	
Signature of Parent / Guardian in the case of a minor	

Appendix E: ISR and COREC Ethics Forms



**Sheffield
Hallam University**

*The Centre for Sport and
Exercise Science*

Faculty of Health and Wellbeing
Sheffield Hallam University
City Campus Howard Street
Sheffield S1 1WB UK

Telephone +44 (0)114 225 2544
Fax +44 (0)114 225 4341
E-mail cses@shu.ac.uk
www.shu.ac.uk/cses

Executive Dean of Faculty
Professor Dawn Forman

Direct Line: 0114 225 4333

13 November 2006

fao Andrew Hutchison

Dear Andrew

Independent Scientific Review (Research Governance Framework NHS)
Study Title:

As I am sure you are aware, the Research Governance Framework became mandatory in the NHS on 1st October 2004. As part of this process, we, as a university, are required to undertake individual scientific review of any study that will involve the NHS facilities, staff, patients or carers.

Having received your proposal, I have had it independently reviewed by two experts in the area, and enclose one of the reviewers' reports. The decision of the reviewers was that your study has acceptable scientific rigour and that you can now proceed to the NHS research governance procedure. Once this process is complete please provide a copy of their approval letter.

Both reviewers have made some suggestions that are intended to help you to improve your proposal and suggest that these changes are made before you submit to NHS Research Governance.

It is anticipated that your research department will accept this documentation as evidence of Independent Scientific Review.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Edward M. Winter'.

Edward M. Winter BEd MSc PhD FBASES FaPE
Professor of the Physiology of Exercise

cc Jeff Breckon
Lynne Johnston

encs

West Glasgow Ethics Committee 1

Western Infirmary
Dumbarton Road
Glasgow G11 6NY

Telephone: 0141 211 6238
Facsimile: 0141 211 1920

06 March 2007

Mr Andrew John Hutchison
Research Student
Sheffield Hallam University
(Research Student) A213 Collegiate Hall
Collegiate Crescent Campus
Sheffield
S10 2BP

Dear Mr Hutchison

Full title of study: Understanding Physical Activity Related Behaviour
Change: What are the processes involved?
REC reference number: 07/S0703/20
Protocol number:
EudraCT number:

The Research Ethics Committee reviewed the above amended application at the meeting held on 06 March 2007.

Ethical opinion

The members of the Committee present gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation.

Ethical review of research sites

The favourable opinion applies to the research sites listed on the attached form. **Conditions of approval**

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Application	5.3	16 January 2007
Protocol		16 January 2007

Delivering better health

www.nhsggc.org.uk

Covering Letter		17 January 2007
Covering Letter		15 February 2007
Compensation Arrangements		01 August 2006
Advertisement	2	12 December 2006
Letter of invitation to participant	2	12 December 2006
GP/Consultant Information Sheets		16 January 2007
Participant Information Sheet		16 January 2007
Participant Information Sheet	Revised Version 2	15 February 2007
Participant Consent Form	1	16 January 2007
Response to Request for Further Information		15 February 2007
Risk Assessment Form		16 January 2007
Bibliography		16 January 2007
Student Research CV		10 December 2006
Investigators CV		10 December 2006
Interview schedules/topic guides	1	02 December 2006

R&D approval

The study should not commence at any NHS site until the local Principal Investigator has obtained final approval from the R&D office for the relevant NHS care organisation.

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

None

Statement of compliance

This Committee is recognised by the United Kingdom Ethics Committee Authority under the Medicines for Human Use (Clinical Trials) Regulations 2004, and is authorised to carry out the ethical review of clinical trials of investigational medicinal products.

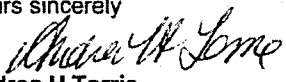
The Committee is fully compliant with the Regulations as they relate to ethics committees and the conditions and principles of good clinical practice.

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

07/S0703/20	Please quote this number on all correspondence
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With the Committee's best wishes for the success of this project

Yours sincerely


Andrea H Torrie
Ethics Manager – West Glasgow LRECs

Email: andrea.torrie@northglasgow.scot.nhs.uk

Enclosures: *List of names and professions of members who were present at the meeting and those who submitted written comments*
Standard approval conditions SL-AC2
Site approval form (SF1)

Copy to: *R & D Office Sheffield Hallam University*
Centre for Sport and Exercise Sciences

West Glasgow Ethics Committee 1

Attendance at Committee meeting on 06 March 2007

<i>Name</i>	<i>Profession</i>	<i>Capacity</i>
Dr J Hunter	Chairman – Consultant Rheumatologist	
Dr A R Binning	Vice-Chair – Consultant Anaesthetist and ITU consultant	
Mr R Donald	Lay-member	
Ms C Cowan	Nurse	
Mr R Sim	Lay-member	
Em Prof D Stewart-Tull	Lay-member	
Dr J Thorburn	Lay-member	
Dr C Weir	Statistician	
Dr D Attwood	Dental representative	
Mr C Rodden	Pharmacist	
Dr K Duffy	Senior Lecturer in research methods	
Dr R Davidson	Consultant in Clinical Genetics	
Mrs A H Torrie	Ethics Manager	

REC reference number:	07/S0703/20	Issue number:	0	Date of issue:	06 March 2007
Chief Investigator:	Mr Andrew John Hutchison				
Full title of study:	Understanding Physical Activity Related Behaviour Change: What are the processes involved?				
This study was given a favourable ethical opinion by West Glasgow Ethics Committee 1 on 06 March 2007. The favourable opinion is extended to each of the sites listed below. The research may commence at each NHS site when management approval from the relevant NHS care organisation has been confirmed.					
Principal Investigator	Post	Research site	Site assessor	Date of favourable opinion for this site	Notes ⁽¹⁾
Hutchison, Andrew		Gloucestershire Partnership NHS Trust and Sheffield Care Trust	West Glasgow Ethics Committee 1	06/03/2007	
Approved by the Chair on behalf of the REC: <i>Andrew John Hutchison</i> (Signature of Chair Co-ordinator) (delete as applicable) <i>A J Hutchison</i> (Name)					

(1) The notes column may be used by the main REC to record the early closure or withdrawal of a site (where notified by the Chief Investigator or sponsor), the suspension of termination of the favourable opinion for an individual site, or any other relevant development. The date should be recorded.

Appendix F: Risk Assessment Form



Sheffield Hallam University

Faculty of Health and Wellbeing Research Ethics Committee Sport and Exercise Research Ethics Operating Group

Risk Assessment Pro Forma

Procedure	Qualitative in-depth interviews. These will involve asking a variety of open ended questions in order to explore the participants' perceptions and experiences relating to the processes of physical activity behaviour change.
------------------	---

Assessment Number	1
--------------------------	---

Date Assessed	3/10/06
----------------------	---------

Assessed By	Andrew Hutchison
--------------------	------------------

Signed	Position
	Research Student (principle researcher for this study)

Hazards	Risks and Specific Control Measures
Psychological discomfort due to the exploration of potentially sensitive issues	Risk: Low The interviewer will be specifically trained in order to develop specific interviewing skills. The participant information sheet highlights that there is no obligation to answer any of the questions and the participants can withdraw from the study at any time.
Confidentiality Risks	Risk: Low Only the consent forms will contain personal information about the participants. Only the principle researcher and the two supervisors will have access to any personal information and interview data. All interview data will be stored on a secure computer under password protection. Consent forms and interview recordings will be stored in a locked drawer within a secure office.

Physical Discomfort if interviews are long	Risk: Low Participants will be allowed to take breaks whenever they need to.

Risk Evaluation (Overall)
Overall, this study involves very low risk procedures, which can be easily and effectively controlled for using the methods mentioned above.
General Control Measures
Is a pre-screen medical questionnaire required? Yes [<input type="checkbox"/>] No [<input checked="" type="checkbox"/>]

Emergency Procedures
If any emergency should occur then the principle researcher will act accordingly and appropriately. The emergency services can be called (999 or 888 from university phones) if the emergency services need to be summoned.

Monitoring Procedures
<p>In order to monitor all of the above controls the following procedures will be implemented:</p> <ul style="list-style-type: none"> - Before conducting any interviews within this study, the interviewer will have to receive training in interview techniques in order to develop competence in interview delivery. - A written procedure will be produced to outline what the interviewer should do in emergency situations. These procedures will be learnt by the interviewer prior to conducting any interviews.

Review Period	
----------------------	--

Reviewed By	Date

Appendix G: Final NVivo Node Structure

Descriptive Tree	Related Child Nodes	Additional Child Nodes
Un-assgncd Cognitions	<ol style="list-style-type: none"> 1. Conscious Valuing 2. Control/Behavioural Regulation 5. Desire for Change 6. Determination 7. Emotional Arousal 8. Enjoyment 9. Extrinsically Motivated 10. Intention 11. Intrinsically Motivated 12. Perceived Effort 13. Reluctant to Participate 14. Willingness to Participate 	<ol style="list-style-type: none"> 3. Internal 4. External
Sources/Perceptions	<ol style="list-style-type: none"> 15. Experiences of Poor Health 16. Health Related Perceptions 17. Feeling Related to Others 18. Feeling Understood 19. Information or Advice Giving 20. Perceptions of Competence 21. Sense of Achievement 22. Sense of Shared Purpose 23. Verbal Encouragement 24. Vicarious Experiences 	
Attitudes/Beliefs/Values	<ol style="list-style-type: none"> 25. Core Beliefs/Values 26. Outcome Orientated Beliefs 27. Self-Efficacy Beliefs 28. Socially Orientated Beliefs 	
Actions	<ol style="list-style-type: none"> 29. Habitual Participation 30. Instances of Willing Participation 31. Meeting Individual Needs 32. Overcoming Barriers 33. Participation Lapses 34. Social Interaction 	
Higher Order Processes	<ol style="list-style-type: none"> 35. Change 41. Health Professional Facilitated Support 42. Problem Recognition 43. Situational Conflict 44. Socially Facilitated Support 45. Value Re-Structuring 46. Value Conflict 47. Value Congruence 	<ol style="list-style-type: none"> 36. Situational 37. Perceptual 38. Attitudinal 39. Behavioural 40. Physical
Contextual Information	<ol style="list-style-type: none"> 48. Environment 	
Barriers	<ol style="list-style-type: none"> 49. Deteriorated Physical Health 50. Environmental 51. Time 	
Dimensions/Descriptives	<ol style="list-style-type: none"> 52. High/Low 55. Positive/Negative 58. Time 	<ol style="list-style-type: none"> 53. High 54. Low or Lacking 56. Positive 57. Negative 59. Pre-Referral 60. During Scheme 61. Post-Scheme

Appendix H: Cognitive Conceptualization Pro-Forma (Beck, 1995)

Patients Name:

Date:

Diagnosis: Axis I:

Axis II:

